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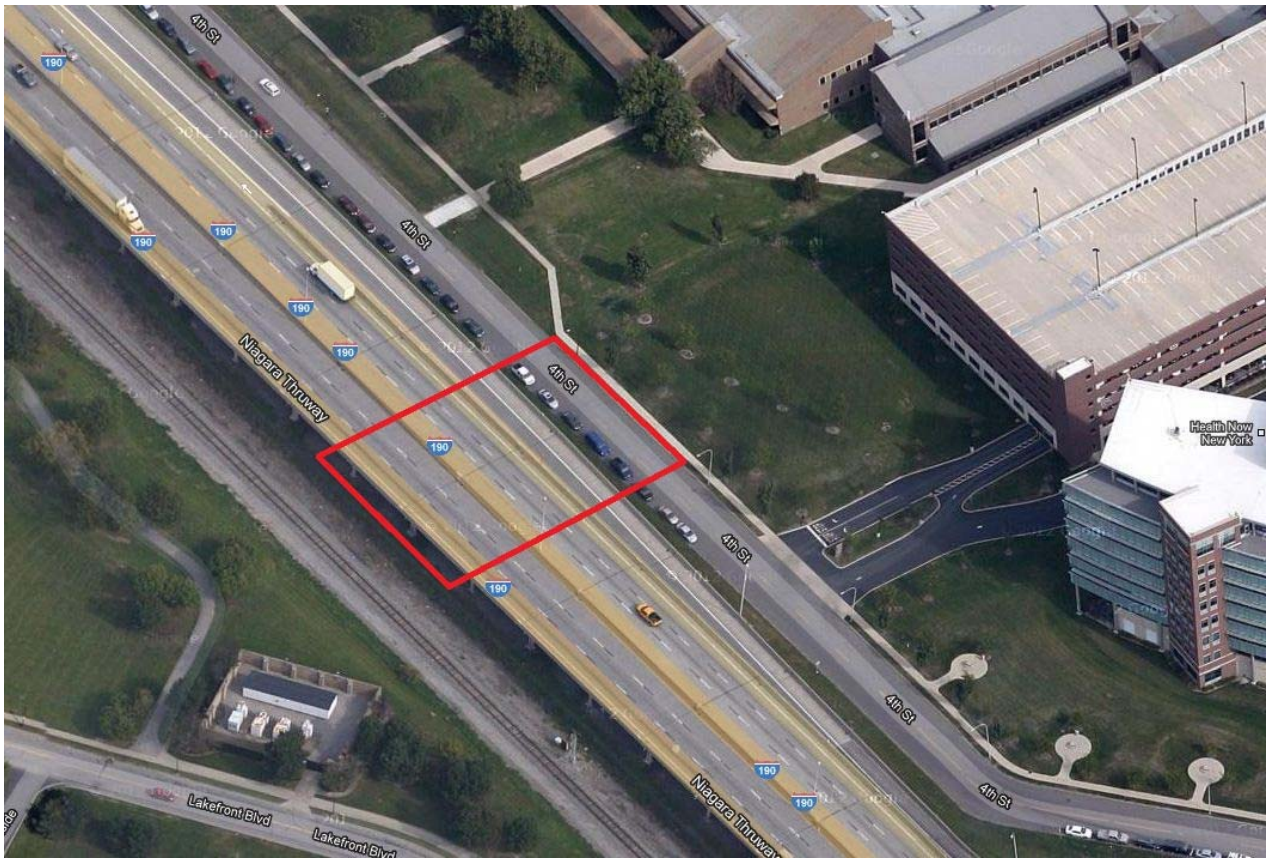
National Fuel Gas Distribution Corporation

Site Characterization Report

Former Buffalo Service Station – Off-Site
Site # C915194A
Buffalo, New York

May 2013; Revised November 2013 and December 2015



ARCADIS

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Site # C915194A
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National Fuel Gas Distribution Corporation

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Acronyms and Abbreviations

ASP	Analytical Services Protocol
ASTM	American Society for Testing and Materials
BSA	Buffalo Sewer Authority
BTEXT	benzene, toluene, ethylbenzene, and xylenes
CSCOs	Restricted-Use Commercial Soil Cleanup Objectives
DNAPL	Dense Nonaqueous Phase Liquid
DUSRs	Data Usability Summary Reports
ft bgs	feet below ground surface
GPR	ground-penetrating radar
HSA	hollow stem auger
IDW	Investigation-derived waste
ISCOs	Restricted-Use Industrial
LNAPL	Liquid Nonaqueous Phase Liquid
mg/kg	milligrams per kilogram
MGP	Manufactured Gas Plant
NAPL	nonaqueous phase liquid
National Fuel	National Fuel Gas Distribution Corporation
NYCRR	New York City Rules and Regulations
NYS	New York State

NYSDEC	New York State Department of Environmental Conservation
NYSTA	New York State Thruway Authority
PAHs	polycyclic aromatic hydrocarbons
PID	photo ionization detector
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RI	Remedial Investigation
RSCOs	Restricted-Use Residential Soil Cleanup Objectives
SC	Site Characterization
SC Report	Site Characterization Report
Site	Former Wilkeson Slip/Canal Area
SI	South Interceptor
SVOCs	semi-volatile organic compounds
TAL	Target Analyte List
TCL	Target Compound List
ug/L	micrograms per liter
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds called
WPA	Work Progress Administration
WSP	WSP Engineering of New York, P.C.

Executive Summary

This Site Characterization Report (SC Report) summarizes work performed and results obtained for the Site Characterization (SC) field activities at the Former Buffalo Service Station – Off-Site site ("Site") located in Buffalo, Erie County, New York (Figure 1). The Site has also been referred to as the Wilkeson Slip/Canal Area Site. The SC work was conducted by ARCADIS, on behalf of National Fuel, in accordance with the Administrative Consent Order (Index # B9-0695-05-06A) between National Fuel and the New York State Department of Environmental Conservation (NYSDEC). The SC was designed to investigate the potential presence of MGP-related impacts associated with the former Buffalo Service Station (BSS) site that is located adjacent to the eastern edge of the Site. The SC investigation was conducted between January 2012 and August 2013.

The Site is located at the historical confluence of the former Wilkeson Slip and the former Erie Canal, and beneath Fourth Street (Figure 2). The former Erie Canal was filled in the 1930's and the former Wilkeson Slip was filled between 1895 and 1915. The Site is approximately 120 feet by 180 feet and extends from the eastern edge of Fourth Street, under and to the west edge of the New York State (NYS) Interstate I-190 overpass. The portion of the Site that lies beneath Fourth Street is owned by the City of Buffalo, while the portion beneath the I-190 overpass is owned by the New York State Thruway Authority (NYSTA) and/or the State of New York. An approximate 11-foot diameter combined sewer runs parallel with and beneath the northbound lane of the I-190 overpass. A 23-kilovolt electrical line (encased in a concrete duct bank) roughly bisects the Site in the east-west direction. The western boundary of the Site is denoted by a chain-link fence that runs between the Site and the railroad.

The Site is located adjacent to and west of the former BSS site. As shown on Figure 2, Wilkeson Slip was located northwest and adjacent to the former BSS site. Previous investigations and remedial actions at the former BSS site indicated that MGP-related impacts (primarily coal tar) were observed within the limits of the former Wilkeson Slip. These impacts were observed to extend in the direction of the Site and potentially beneath the eastern and western edges of Fourth Street. An excavation (i.e., Fourth Street Utility Corridor Excavation), completed by WSP Engineering of New York, P.C. (WSP) on behalf of QLT Buffalo LLC between June and September 2012, removed the coal tar within the utility corridor (within the former slip) extending to the eastern edge of the Site (i.e., edge of Fourth Street). The limits of the excavation are shown as Cell's A and B on Figure 2. Coal tar was also observed in a soil boring (RB-37) on the western edge of Fourth Street completed during the investigation of the former BSS site in 2003.

The chief chemical constituents typically found in coal tar are the volatile organic compounds (VOCs) benzene, toluene, ethylbenzene, and xylenes (BTEX) and a class of semi-volatile organic compounds (SVOCs) called polycyclic aromatic hydrocarbons (PAHs). Purifier waste is also typically found at former manufactured gas plants sites and this waste often contains elevated levels of cyanide. The overall objective of the SC was to determine whether MGP-related impacts, such as coal tar, purifier waste, and associated chemical constituents, are present in soil and/or groundwater at the Site, and if present, evaluate whether additional investigations are warranted to determine the nature and extent of the impacts.

The SC work consisted of:

- drilling ten soil borings.
- converting four of the soil borings into monitoring wells.
- measuring four rounds of water-level measurements at the new and existing monitoring wells.
- collecting 21 soil samples, up to three from each soil boring, for chemical analysis.
- collecting two rounds of groundwater samples from each new monitoring well for chemical analyses.
- evaluating potential Site-related impacts to the combined sewer beneath Fourth Street.

The key findings of the SC investigations are presented below.

Geology/Hydrogeology

- Two principal overburden geologic units exist beneath the Site: fill and native alluvium. The fill is approximately 6 to 21 feet in thickness, and consists of silt, clay, fine to coarse sand, fine to coarse gravel, slag, and bricks. The alluvium deposit consisting of clay, silt, fine sand, and gravel is approximately 7 to 18 feet thick. Bedrock was encountered at a depth of 21 to 25 feet below ground surface (ft bgs).
- The water table is encountered at approximately 6 to 10 feet below grade. Groundwater flow is generally to the southwest across the Site; however, a groundwater mound with radial flow is observed near northern corner of the Site.

Soil Quality

- The only visual indication of potential impacts observed during the SC was black staining observed in one- to-two foot soil intervals at two soil borings and a trace amount of sheen observed in one other boring. The highest photo ionization detector (PID) reading recorded during the investigation was 14.1 parts per million (ppm). Coal tar was likely observed in a boring (RB-37) completed in 2003 along the western edge of Fourth Street prior to the SC.

- None of the 21 SC soil samples contained VOC concentrations above applicable NYSDEC criteria.

- Only 4 of 21 soil samples collected during the SC contained low levels of PAHs slightly above applicable NYSDEC criteria. The PAHs detected in these samples is attributed to abundant fill resulting from the filling of the former Erie Canal. One sample collected from boring RB-37 (during a previous investigation conducted in 2003) contained elevated levels of PAHs that are likely related to the potential presence of coal tar observed in the sample.

- Metals were detected in all SC soil samples, but only three samples contained concentrations above applicable NYSDEC criteria. The presence of metals in soil is also likely related to the abundant fill resulting from the filling of the former Erie Canal.

- Cyanide was not detected in SC soil samples at concentrations above applicable NYSDEC criteria.

Groundwater Quality

- Three VOCs (benzene, ethylbenzene, and/or xylenes) were detected in groundwater samples from two monitoring wells at concentrations above applicable NYSDEC criteria. These samples were collected from monitoring wells located within or near the approximate eastern half of the Site and within the western limits of the former Wilkeson Slip where coal tar was previously observed. VOCs were not detected above NYSDEC criteria in samples collected from downgradient monitoring wells.

- Acenaphthene, benzo(a)anthracene, and/or naphthalene (all PAH compounds) were detected at concentrations above NYSDEC criteria in groundwater samples from the same two wells that contained VOCs exceedances. Groundwater from the

downgradient wells did not contain concentrations of PAHs above NYSDEC criteria.

- Metals were detected in all collected SC groundwater samples above applicable NYSDEC criteria. The elevated metals concentrations in groundwater are attributed to the presence of abundant fill at the site and/or natural background concentrations.

- No cyanide was detected in groundwater at concentrations above NYSDEC criteria.

Sewer Assessment

The sewer assessment determined that an 11.5-foot diameter combined sewer is located beneath the northbound lane of the I-190 overpass. The sewer was apparently constructed on or near the bedrock surface. Information obtained during the SC suggests that tar is not likely in contact with the sewer, and given the robust construction of the sewer, tar and/or potentially impacted groundwater would not be expected to enter the sewer. Even if tar/impacted groundwater were to enter the sewer, any potential impacts would be negligible because of the large volume of sewage flowing in the sewer and because the sewer does not have a surface water overflow component.

Conclusion

Concentrations of PAHs and metals were detected in certain SC soil samples at levels above applicable NYSDEC criteria. This is not surprising since PAHs are formed during the incomplete combustion of fossil fuels, garbage, or any other organic matter; consequently, PAHs are ubiquitous, especially in urban environments like the City of Buffalo. The presence of PAHs, combined with the absence of visual impacts and elevated non-MGP related metal concentrations, is expected due to the abundant fill resulting from the filling of the former Erie Canal in the Site area. Although the low-level PAHs detected in SC soil samples do not appear to be related to the former MGP, one sample collected from boring RB-37 (during an investigation completed in 2003) contained elevated levels of PAHs that are likely due to the potential presence of coal tar in the sample.

Some BTEX and PAH compounds were detected above applicable NYSDEC criteria in groundwater from two SC monitoring wells located within and near the former Wilkeson Slip. These detections are possibly associated with the dissolution of MGP-related

impacts (principally coal tar) observed beneath the eastern edge of Fourth Street (observed during the Fourth Street Utility Corridor Excavation) and at a soil boring (RB-37) installed at the western edge of Fourth Street during a 2003 investigation. The elevated levels of BTEX and PAHs in groundwater appears to be constrained to the eastern portion of the Site as groundwater sampled in wells downgradient (west) from this area does not contain elevated BTEX or PAH concentrations.

Given the information presented in this SC Report, a small region of residual coal tar from the former BSS site likely remains within the limits of the former slip beneath Fourth Street. Although coal tar may be present beneath Fourth Street, the results of the SC indicate that the tar (and related dissolved-phase impacts from the tar) is not present in the portion of the Site west of Fourth Street (underneath the I-190 overpass). The potential tar may extend from beneath the eastern edge of Fourth Street (from the west side of the Fourth Street Utility Corridor Excavation sheeting) to the western edge of Fourth Street (in the area of soil boring RB-37, drilled in 2003). The tar is not likely to be in contact with an 11.5–foot diameter sewer located beneath the northbound lane of the I-190 overpass and tar and/or impacted groundwater is not likely entering the sewer.

ARCADIS concludes that any potential exposure of humans or wildlife to potential impacts beneath Fourth Street is minimal because any residual coal tar observed within the Site is located approximately 15 to 19 feet below grade. Any such residual is below the reach of normal utility and road maintenance or replacement activities. Furthermore, potable water within the City limits is provided by a public source.

Given the limited extent of MGP-related impacts to soil and groundwater beneath the Site and the lack of potential human or wildlife exposure to these impacts, ARCADIS concludes that a Remedial Investigation (RI) is not warranted for the Site.

1. Introduction

This SC Report summarizes work performed and results obtained for the SC field activities at the Former Buffalo Service Station – Off-Site site ("Site") located in Buffalo, Erie County, New York (Site # C915194A). The Site location is shown on Figure 1. The Site has also been previously referred to as the Wilkeson Slip/Canal Area site. The SC work was conducted by ARCADIS, on behalf of National Fuel, in accordance with the Order on Consent (Index # B9-0695-05-06A) between National Fuel and the NYSDEC. The SC was designed to investigate the potential presence of MGP-related impacts associated with the former Buffalo Service Station (BSS) site that is located adjacent to the eastern edge of the Site.

The SC investigation was conducted between January 2012 and August 2013. The SC activities were implemented in accordance with the following:

- NYSDEC-approved SC Work Plan (ARCADIS, 2011) and the following supporting appendices:
  - Appendix A – Field Sampling Plan (FSP)
  - Appendix B – Quality Assurance Sampling and Analysis Project Plan (QASAPP)
  - Appendix C – Health and Safety Plan (HASP)
  - Appendix D – Dense Nonaqueous Phase Liquid (DNAPL) Contingency Plan (DCP)
  - Appendix E – Community Air Monitoring Plan (CAMP)
- June 18, 2012 Work Plan Addendum (ARCADIS, 2012)
- NYSDEC's June 24, 2013 comments on the May 2013 Draft SC Report
- ARCADIS' July 9, 2013 responses to the NYSDEC June 24, 2013 comments on the Draft SC Report

Note that this SC Report supersedes the Draft SC Report submitted to the NYSDEC in May 2013 and revised SC Report submitted to the NYSDEC in November 2013.

1.1 SC Objectives

The overall objectives of the SC were to:

- Assess whether MGP-related residual materials (primarily coal tar) are present on Site that are related to operation of the former BSS Site that is located adjacent to the eastern edge of the Site.
- Determine whether MGP-related residual materials, if present at the Site, have a potential to pose a significant threat to public health or the environment.
- Determine whether a Remedial Investigation (RI) of the Site is appropriate.

The balance of this section presents the report organization and describes the characteristics of the Site and its history and the previous investigations performed in the Site area.

1.2 Report Organization

The SC Report has been organized into the following sections:

Section	Purpose
Section 1 – Introduction	Provides background information relevant to the development of the SC Report and objectives of the SC investigation.
Section 2 – Site Characterization Activities	Describes the field activities related to the investigation of soil and groundwater.
Section 3 – Site Characterization Findings	Describes the field observations and laboratory results of the SC investigation.
Section 4 – Conclusion	Presents the conclusion and recommendations based on the SC investigation results.
Section 5 – References	Presents a list of the references cited in the SC Report.

1.3 Site Description and History

1.3.1 Site Description

As shown on Figure 2, the Site is approximately 120 feet by 180 feet and extends from the eastern edge of Fourth Street, under and to the west edge of the NYS Interstate I-190 overpass in Buffalo, New York. The portion of the site that lies beneath Fourth Street is owned by the City of Buffalo, while the portion beneath the I-190 overpass is owned by the NYSTA. An approximate 11.5-foot diameter sewer runs parallel with and beneath the northbound lane of the I-190 overpass, bisecting the Site. An approximate 15-inch diameter reinforced concrete storm sewer pipe, situated approximately 1.5 ft bgs, runs parallel with and beneath the northbound lane of Fourth Street in the eastern portion of the Site. A 23-kilovolt electrical line (encased in a concrete duct bank) roughly bisects the site in the east-west direction. The western boundary of the Site is denoted by a chain-link fence that runs between the site and the railroad. Groundwater in the site area is not used as a drinking water supply within the City of Buffalo (Groundwater Technology, 1996).

Site, looking toward Lake Erie. Fourth Street in foreground and I-190 in background.

1.3.2 Site History

Historical use of the Site was determined primarily through a review of available Sanborn Fire Insurance maps and atlas' of the Buffalo, New York area. Based on a review of this information, the Site was historically the location of the confluence between the former Wilkeson Slip and the former Erie Canal. The historical locations of the former Wilkeson Slip and the former Erie Canal are shown on Figure 2. A summary of the information gleaned from the Sanborn maps and the Buffalo, New York atlas' relative to these two features is provided below:

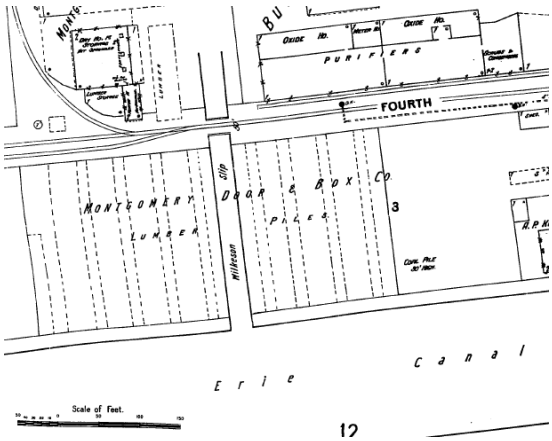
- *1845 Buffalo Atlas*. The former Wilkeson Slip is shown extending east to Jackson Street. The atlas does not show buildings (only streets and waterways).

- *1888 Sanborn Map*. The former Wilkeson Slip is present, but the site is not shown on the map.

- *1891 Buffalo Atlas*. The former Wilkeson Slip and the former Erie Canal are present, and a small portion of the Site (adjacent to the slip and canal) is shown as owned by Buffalo Gas Company; no structures are shown in the site area.

- *1895 Buffalo Atlas*. No change from the 1891 Buffalo Atlas, except that no property owner is shown.

- *1899 Sanborn Map*. The former Wilkeson Slip and the former Erie Canal are present, and a small portion of the Site (adjacent to the slip and canal) is shown as lumber storage and owned by Montgomery Door and Box Company.



1899 Sanborn Map; Notice former location of Fourth Street north of present-day Fourth Street.

- *1915 Buffalo Atlas*. The former Wilkeson Slip has been filled in, but the former Erie Canal is present.

- *1925 Sanborn Map*. The former Erie Canal is present, and a small portion of the Site (adjacent to the slip and canal) is shown as lumber storage and owned by Montgomery Door and Box Company.

- *1951 Sanborn Map*. No structures or ownership information is shown.

The former Erie Canal bed and related canal beds have been the subject of extensive historical waste disposal and filling activity. Based on historical research, activities to fill in the former Erie Canal were undertaken as a Work Progress Administration (WPA) project in the 1930s. The WPA project in the Buffalo area was funded and coordinated by the federal government with involvement from New York

State and the City of Buffalo. The WPA project has been described as filling in and narrowing the channel of the Old Erie Canal[1]. During 1937, the WPA filled the canal bed with "everything they [could] find,"[2] including slag, excess dirt from the high canal banks, and cinders of "riverfront industrial plants."[3]

1.4 Summary of Previous Investigation and Remediation Activities

Numerous investigations and/or remedial projects have been completed on the former BSS site since 1989. Observations made during the pre-design investigation completed in 2003, Brownfield Cleanup Program completed in 2005 and 2006, and Fourth Street Utility Corridor Excavation completed in 2012 provided information suggesting that MGP-related residuals could be present in the Site area. The salient findings of these three activities as they relate to the Site are summarized below.

Pre-Design Investigation (2003)

In August 2003, as part of the pre-design investigation completed by RETEC (RETEC 2004), soil borings RB-36, RB-37, and RB-38 were drilled along the west side of Fourth Street on the Site. The locations of RB-36, RB-37, and RB-38 are shown on Figure 2. No visual impacts were observed in the soil samples collected during the drilling of RB-36 and RB-38, and VOCs were not detected with the PID. During the drilling of RB-37, "hydrocarbon-like odor and sheen" were observed at depths of 12 to 16 ft bgs, and the PID reading was 93.8 ppm for the interval; and at depths of 18 to 19 ft bgs, "visible NAPL blebs, hydrocarbon-like sheen and odor" were observed, and the PID reading was 38.6 ppm for the interval. No visual impact or PID readings were measured from 19 to 21 ft bgs. The boring was terminated at 21 ft bgs.

One soil sample was collected from each of the three soil borings (RB-36, RB-37, and RB-38) for analysis of BTEX, PAHs, and several metals. The sample locations and analytical results for are shown on Figure 6. In the soil sample collected from 15 to 16 ft bgs at RB-36, total BTEX and PAHs were detected at concentrations of 0.046 and 472.1 milligrams per kilogram (mg/kg), respectively. In the sample collected from

[1] Works Progress Administration, Statement of Allotment Detail for Work Project, undated; Works Progress Administration, Statement of Allotment Detail for Work Project, dated March 1, 1936; Work Progress Administration, Project Proposal, dated August 23, 1935; Works Progress Administration, Project Application, dated August 26, 1935; Works Progress Administration, Statement of Project Estimate Detail, dated July 7, 1936; Works Progress Administration, Statement of Project Estimate Detail, dated December 17, 1936.
[2] Courier Express, Forlorn Gutter at City's Door Being Removed, January 10, 1937, section 7, p. 3.
[3] Id.

17.5 to 19.5 ft bgs in RB-37, total BTEX and total PAHs were detected at concentrations of 58.91 and 11,185 mg/kg, respectively. Total BTEX and total PAHs were not detected in the soil sample collected from 13.4 to 15.4 ft bgs in RB-38 (RETEC 2004).

Brownfield Cleanup Program (2005 and 2006)

In 2005 and 2006, a remedial action was completed at the former BSS site under Order on Consent B9-0577-00-05(A). The remedial action included excavation of fill material from the portion of the former Wilkeson Slip located east of the Site (ESC, 2006). The excavation extended from the Waterfront School in a westerly direction to approximately 30 feet from the Site. A sheet-pile wall installed at the western end of the excavation demarcates the western extent of the excavation in the former Wilkeson Slip area at this time.

During the first quarterly groundwater monitoring event in August 2007, nonaqueous phase liquid (NAPL) was measured in a monitoring well installed to the east of the sheet-pile wall (MW-04). The presence of NAPL at MW-04 was evaluated during subsequent quarterly sampling events from August 2007 to May 2009, and NAPL thicknesses of less than 0.01 foot have been measured (WSP 2009b).

Fourth Street Utility Corridor Excavation (2012)

WSP implemented an excavation project (i.e., Fourth Street Utility Corridor Excavation) on behalf of QLT Buffalo LLC in an area located adjacent to the east side of the Site. The project was reportedly completed in general conformance to WSP's *Final Supplemental Work Plan – Fourth Street Utility Corridor Excavation,* dated May 31, 2012. The excavation project was initiated on June 28, 2012, and was substantially completed on September 4, 2012. The excavation project consisted of installation of sheet piling and support structures to allow excavation of soil beneath live, high voltage electrical conduits. The

Looking southeast. Coal tar entering excavation from beneath Fourth Street (on the right).

excavation was split into two “cells”, cells A and B (Figure 2), where the eastern wall of each cell consisted of the sheet pile was that was left in place during the 2005 and 2006 Brownfield Cleanup Program. After removing approximately 6 feet of clean overburden material, the excavation within the sheet piles was advanced down to approximately 18 to 20 ft bgs, where WSP encountered a clay layer. A test pit was excavated through the clay and revealed that the clay was approximately 3 to 5 feet thick and situated on top of bedrock.

At the base of the excavation (i.e. on top of the clay layer), at a gap in the sheet piling beneath the electrical conduit (where no sheet piling could be installed), a material resembling coal tar accompanied by a heavy sheen was observed entering the excavation from beneath Fourth Street. Some investigation by WSP revealed that there was no evidence of the coal tar-like material extending into the clay. With NYSDEC approval, WSP removed approximately 1-foot of clay across the bottom of the excavation area (total excavation depth of 19 to 21’ bgs), then sampled the clay material to document that the remaining clay was not impacted. When the sample results showed that the clay layer was not impacted, WSP filled the excavation from the top of the clay layer up to approximately elevation 576’ (approximately 6’ bgs) with flowable fill material. The remainder of the excavation area was backfilled with clean overburden material that had been staged onsite.

A total of 70 loads (approximately 1,600 tons) of soil were removed from the Cells A and B for off-site disposal.

2. Site Characterization Activities

This section summarizes SC field activities that were implemented by ARCADIS between January 2012 and August 2013. The schedule of the SC activities was longer than anticipated due to permitting and access constraints posed by the property owners (the NYSTA, and others, and City of Buffalo), and due to the construction activities associated with Fourth Street Utility Corridor Excavation. The SC field activities consisted of the following general activities:

- Conducted utility mark-out using DigSafelyNY and surveyed the locations of the marked utilities.
- Conducted a geophysical survey to locate sub-grade structures, possible unknown utilities, and the location of the former Wilkeson Slip and former Erie Canal. The geophysical survey was performed using electromagnetic (EM-31) and ground-penetrating radar (GPR) surveys in accessible areas of the Site.
- Surveyed utility locations and structures identified during the geophysical survey.
- Drilled ten soil borings and converted four soil borings to monitoring wells, seven borings on the NYSTA property and three on the City of Buffalo property.
- Collected 21 subsurface soil samples from soil borings for chemical analysis.
- Collected two rounds of groundwater samples from the four new monitoring wells for chemical analysis and measured hydraulic conductivity data during sampling.
- Measured four rounds of groundwater levels from the four new monitoring wells and two existing monitoring wells associated with the former BSS site.
- Surveyed SC investigation locations relative to a common datum.
- Completed an assessment of the 11.5-foot diameter South Interceptor (SI) combined sewer that runs beneath the northbound lane of the I-190 overpass.

An analytical sample summary, which identifies soil and groundwater samples collected as part of the SC, is included in Table 1. A summary of construction details for the monitoring wells installed as part of the SC is included in Table 2. Groundwater level measurements at monitoring wells are presented in Table 3.

Comprehensive soil and groundwater analytical results for samples collected as part of the SC field activities are presented in Tables 4 and 5.

Three subcontractors provided various services during implementation of the SC field activities, as presented in the following table:

Subcontractor	Office Location	Services Provided
Parratt-Wolff, Inc.	East Syracuse, NY	Drilling
TestAmerica Laboratories	Amherst, NY	Analytical services
McIntosh & McIntosh, P.C	Lockport, NY	Surveying

A description of the above-listed SC field activities is presented below.

2.1 Background Investigation

Several soil borings and monitoring wells completed during the SC were located near utilities and beneath I-190. As such, a background investigation was conducted to evaluate the presence of sub-grade structures prior to drilling the soil borings. In addition, information from the background investigation was used to further evaluate the location of the former Wilkeson Slip and former Erie Canal. The background investigation consisted of the following components:

- Obtaining as-built drawings for I-190 and the utility corridor.

- Conducting a utility mark-out using DigSafelyNY, then surveying the locations of the marked utilities.

- Conducting a geophysical survey to locate sub-grade structures, possible unknown utilities, and the location of the former Wilkeson Slip and former Erie Canal. The geophysical survey was performed using electromagnetic (EM-31) and ground penetrating radar (GPR) surveys in accessible areas of the site. The results of the geophysical investigation are shown on Figure 1 of Appendix C – Results of Geophysical Study. In addition to buried utilities, the geophysical survey identified numerous areas with indications of small and larger metal debris and unknown structures. The areas of metal debris and possible buried structures are not unexpected given the inherent nature of fill. An area of apparent higher conductivity material was observed on the southern side of the former Erie Canal area, this higher conductivity is likely related to the finer grained fill in this area.

- Surveying utility locations and structures identified during the geophysical survey.

- Using subsurface observations made during the Fourth Street Utility Corridor Excavation to confirm the location of the former Wilkeson Slip. The location of the slip was identified by the obvious presence of wooden wall structures (comprised of timbers) located on both sides of the slip. The location of the slip on the Site base map has been adjusted based on these observations.

2.2 Underground Utility Clearance

Prior to starting intrusive activities, the DigSafelyNY was contacted to request utility mark-outs. As discussed above, a follow-up geophysical survey was conducted to assess the presence of buried utilities in the vicinity of each proposed soil boring/monitoring well location. As an added precaution for worker safety and to minimize the potential for damage to subsurface utilities, boring locations were cleared by non-mechanical means (e.g., hand digging and vacuum extraction) to a maximum depth of 5 ft bgs. Each boring location was backfilled with soil cuttings after the manual utility clearance was completed.

2.3 Soil Investigation

The objectives of the soil investigation were to:

- determine if MGP-related and/or non-MGP-related chemical constituents are present in Site soil by collecting, visually characterizing, and analyzing soil samples.

- identify the potential presence of MGP-related (e.g., coal tar, purifier waste) and non-MGP-related residuals (e.g., petroleum, solvents) in soil.

- obtain sufficient information to evaluate the necessity for further action.

The SC soil investigation consisted of the following:

- Completing ten soil borings to characterize subsurface conditions and facilitate collection of subsurface soil samples for laboratory analysis.

- Collecting and submitting 21 subsurface soil samples from the soil borings for laboratory analysis.

The SC soil investigation activities are described below.

2.3.1 Soil Borings

Soil borings were completed to characterize subsurface conditions at the Site and, in some cases, facilitate groundwater monitoring well installation. A total of ten soil borings (AB-01 through AB-5, and AB-C2) were drilled, and four soil borings were converted to monitoring wells (AW-01 though AW-04). Figure 2 shows the location of the soil borings and monitoring wells. Soil borings were drilled to the depth of refusal, which was encountered at approximately 21 to 25 ft bgs.

Soil borings were completed during two mobilizations: 1) between July 30, 2012 and August 6, 2013; and 2) between November 11 and 12, 2013. All soil borings were drilled using hollow stem auger (HSA) drilling methods. Drilling activities were conducted by Parratt-Wolff, Inc. using an IRA300 drilling rig, under the supervision of an ARCADIS field geologist.

The completion of the soil borings followed a consistent methodology, as follows:

- Soil samples were retrieved continuously from grade to the total boring depth using 2-foot-long split spoons or by a hand auger (during the soil boring utility clearance).

- Soil recovered from each sample interval was visually characterized for color, texture, and moisture content. The presence of visible staining and obvious odors were noted. Soil samples were visually characterized and screened for VOCs using a PID.

- Soil samples were selected for laboratory analyses using the methodology described under Section 2.3.2.

- Following completion, borings were backfilled to grade with cement/bentonite grout using a tremie pipe (except for borings completed to facilitate monitoring well installation).

- Drilling pipes and tooling were decontaminated in between soil borings using a steam pressure cleaner, Alconox® detergent, and potable water. Decontamination water was pumped from a constructed temporary decontamination pad into 55-gallon steel drums.

Soil boring logs that document subsurface conditions encountered at each boring location are provided in Appendix A.

2.3.2 Laboratory Analysis of Subsurface Soil Samples

Two soil samples were collected from each of the nine borings and three samples were collected from one boring (AW-03). Samples were submitted to Test America Laboratories of Amherst, New York, a New York State Department of Health- (NYSDOH-) accredited laboratory certified for the selected analysis. Samples were selected for analysis based on the following:

- One sample was collected from the bottom 2 feet of each borehole.
- A second sample was collected from the depth interval showing the greatest apparent degree of impacts based on visual observations and PID readings. If impacts were not observed, the second sample was collected at the approximate water table.
- Duplicate soil samples were collected at two locations, AW-01(5-7 ft bgs) and AW-04(4-8 ft bgs).

Coal tar and purifier wastes are the primarily waste products observed at MGP sites. The chief chemical constituents typically found in coal tar are the VOCs BTEX and a class of SVOCs called PAHs. Purifier waste is also typically found at MGP sites and this waste often contains elevated levels of cyanide. The overall objective of the SC was to determine whether MGP-related impacts, such as coal tar, purifier waste, and associated chemical constituents, are present in soil and/or groundwater at the Site, and if present, evaluate whether additional investigations are warranted to determine the nature and extent of the impact. As such, the suite of chemical analyses for both soil and groundwater (discussed further below) was chosen to incorporate BTEX, PAHs, and cyanide as well as other chemical compounds that may be associated with non-MGP-related impacts (e.g., chlorinated solvents). To that end, soil samples collected during the SC were analyzed for the following constituents:

- Target Compound List (TCL) VOCs (including BTEX) by United States Environmental Protection Agency (USEPA) Method 8260B
- TCL SVOCs (including PAHs) by USEPA Method 8270C

- Target Analyte List (TAL) Metals by USEPA Method 6000/7000
- Total cyanide by USEPA 9012A
- Free cyanide by USEPA extraction Method 9016 and analysis by microdiffusion using American Society for Testing and Materials (ASTM) method D4282-02

Sample analyses followed the NYSDEC Analytical Services Protocol (ASP) (most recent version). Analytical results were reported using NYSDEC ASP Category B data deliverables.

2.4 Groundwater Investigation

The objectives of the groundwater investigation were to:

- characterize the general shape of the water table and develop a preliminary assessment of overburden groundwater flow patterns at the Site.
- assess the hydraulic characteristics of the materials screened by the wells.
- determine the presence/absence of MGP-related constituents dissolved in groundwater and, if present, at what concentrations.

2.4.1 Monitoring Well Installation

Soil borings AW-01 through AW-04 were converted into groundwater monitoring wells (Figure 2). Monitoring well completion logs are provided in Appendix A, and well construction details are summarized in Table 2. The groundwater monitoring wells installed during the SC were constructed as described below:

- At each monitoring well location, a soil boring was completed using HSA drilling methods described above.
- Well screens were positioned to monitor the saturated overburden at the bottom of each soil boring (immediately above the bedrock surface), except for AW-03 which was constructed with a two-foot long sump.
- Wells were constructed using 2-inch inside-diameter, threaded, flush-joint, schedule 40 PVC casing and screen.

- Screens were 10 feet long with 10-slot (0.01-inch) openings.
- The annulus around the well screen was backfilled with #0 silica sand to a minimum height of 2 feet above the top of the screen.
- A bentonite pellet seal with a minimum thickness of 2 feet was placed above the sand pack. The bentonite seal (pellets) was allowed to hydrate before tremie-grouting above the seal.
- Each monitoring well was secured at the surface with a sealed cap (J-plug) and a flush-mounted vault. The J-plug keeps surface water from infiltrating into the well during rain events.
- The concrete seal or pad was sloped slightly to direct water away from the well, and was deep enough to remain stable during freezing and thawing of the ground. The vaults and concrete pads were completed so that they would not pose a trip hazard.

Monitoring wells were developed by ARCADIS on August 7 and December 1, 2012, using pump and surge methods. Prior to development, fluid levels and the total depth for each well were measured to the nearest 0.01 foot using an electronic oil/water interface probe. Neither light non-aqueous phase liquid (LNAPL) nor dense NAPL (DNAPL) was observed in any of the wells during development. For the development of AW-01 and AW-02, dedicated polyethylene tubing and a grundfos submersible pump were used to pump and surge across a short section of the well screen, then lifted to surge sequentially higher sections of the screen until the entire length of the well screen had been developed. AW-03 and AW-04 were developed using a weighted dedicated bailer to surge the well screen and to purge the well. Development continued until a minimum of three well volumes had been evacuated and/or for a maximum of two hours. Purge water was containerized in 55-gallon drums staged at the site for future disposal.

2.4.2 Groundwater Sampling

Monitoring wells AW-01 and AW-02 were sampled on August 22, 2012 and August 27, 2013, and monitoring wells AW-03 and AW-04 were sampled on December 28, 2012 and August 27, 2013. Samples were collected to evaluate the presence/absence of MGP-related constituents dissolved in groundwater. Groundwater samples were collected from monitoring wells using the low-flow sampling techniques described in the FSP. Groundwater sampling logs are provided in Appendix D. Groundwater field parameters measured during purging included

conductivity, dissolved oxygen, oxidation-reduction potential, pH, and temperature. Samples were containerized in laboratory-provided glassware and preserved with ice and laboratory-provided preservative (as required). Quality Assurance/Quality Control (QA/QC) samples consisted of duplicate samples (from AW-01 and AW-03), Matrix Spike/Matrix Spike Duplicate samples, and trip blanks. Consistent with the analytical suite selected for the soil samples, groundwater samples were submitted to Test America of Amherst, New York, for analysis of the following constituents:

- TCL VOCs (including BTEX) by USEPA Method 8260B
- TCL SVOCs (including PAHs) by USEPA Method 8270C
- TAL Metals by USEPA Method 6000/7000
- Total cyanide by USEPA Method 9012A
- Free cyanide by USEPA Method 9016 (only the first sampling round)

2.4.3 Water-Level Measurement

Four comprehensive rounds of groundwater levels were measured at newly installed monitoring wells and existing monitoring wells MW-01 and MW-08 on December 28, 2012, February 18, 2013, March 6, 2013, and August 27, 2013. During each gauging event, the field staff measured the depth to water and the total depth of each monitoring well. The measurements were converted to elevations relative to feet above mean sea level. The water-level measurements are summarized in Table 3.

2.4.4 Specific-Capacity Tests

Specific-capacity test data were collected at each monitoring well during groundwater sampling. These data were used to estimate the hydraulic conductivity of the material screened by each well according to the method described by Walton (1962). The results of the specific-capacity testing are discussed in Section 3.

2.5 Sewer Assessment

A sewer assessment was conducted to determine if the 11.5 foot diameter combined sewer located beneath the I-190 overpass could be impacted by MGP- related residuals (principally, coal tar) from the Site, and whether such impacts (if any) could pose a risk for direct discharge to surface water bodies. As part of this effort, information regarding the construction and function of the sewer was obtained and evaluated in relation to data obtained during the SC fieldwork. The sewer extends

parallel with and beneath the northbound lane of the I-190 overpass, bisecting the Site. Figure 2 shows the location of the sewer relative to the Site.

2.6 Site Survey

Following the completion of each phase of the investigation, McIntosh & McIntosh, P.C. surveyed the locations of the utilities, soil borings, newly installed monitoring wells, and existing monitoring wells MW-01 and MW-08. The monitoring well survey included the location, ground surface, and measuring-point elevation (as defined as the top of inner casing). Horizontal locations were surveyed relative to New York State Plane - West Zone North American Datum (NAD83) and elevations were surveyed relative to the North American Vertical Datum of 1988 (NAVD88).

2.7 Equipment Decontamination

Equipment was decontaminated in accordance with the procedures presented in the FSP. In general, non-disposable equipment, including drilling tools and equipment, were decontaminated prior to first use on site, between each investigation point, and prior to mobilization. A total of two equipment rinse blanks (one during the August drilling program and one during the November drilling program) were submitted for analysis of TCL VOCs, TCL SVOCs, TAL Metals, and total cyanide to evaluate the integrity of the decontamination procedures, as required in the QASAPP.

2.8 IDW Disposal

Investigation-derived waste (IDW) generated during the SC included:

- Drill cuttings
- Drill water
- Polyethylene sheeting from the temporary decontamination pad
- Development and purge water
- Polyethylene tubing and bailers from well sampling and developing
- Spent personal protective equipment (PPE)

IDW was containerized in Department of Transportation- (DOT-) approved 55-gallon steel drums and staged on wooden pallets in a locked shipping container during field activities. Each drum was secured and labeled with the date, contents, contact information, and other relevant information. A total of 10 drums containing soil cuttings, 2 drums containing PPE and polyethylene wastes, and 10 drums containing liquids

were generated during the SC. Waste characterization samples were collected from each waste stream. Based on the results obtained for the analysis of the waste characterization samples, both solid and liquid IDW materials were transported by a National Fuel-approved waste hauler for off-Site disposal as non-hazardous waste.

2.9 Data Usability Summary Reports

ARCADIS prepared Data Usability Summary Reports (DUSRs) of the soil and groundwater analytical data packages following the SC field activities. QA/QC information is contained and examined in the DUSRs. Based on the results of the completed DUSRs, the data collected during the SC is determined generally usable for the purposes of the SC. The analytical summary tables include the data qualifiers identified in the DUSRs. Copies of the DUSRs are provided in Appendix B.

3. Site Characterization Findings

This discussion of the Site Characterization findings is divided into the following sections:

- Site Geology (Section 3.1)
- Groundwater flow and hydrogeologic characterization (Section 3.2)
- Soil Quality (Section 3.3)
- Groundwater Quality (Section 3.4)
- Sewer Assessment (Section 3.5)

3.1 Site Geology

The Site is located approximately 1,000 feet northeast of Lake Erie, near the mouth of the Upper Niagara River. Topographic relief at the Site is flat and the land surface elevation is approximately 580 feet above mean sea level. The SC investigation identified two principal overburden geologic units beneath the Site:

- ***Fill*** – The fill consists of silt, clay, fine to coarse sand, fine to coarse gravel, slag, and bricks. The fill is up to approximately 6 to 21 feet in thickness and consists of silt, clay, fine to coarse sand, fine to coarse gravel, slag, and bricks. The fill thickness is greatest in the area of the 11.5 – foot diameter sewer beneath I-190 overpass. Native soils would have been excavated to allow for construction of the sewer on the bedrock surface.

- ***Alluvium*** – A native alluvial deposit of clay, silt, fine sand, and gravel is observed beneath the fill. The alluvial deposit was observed in every boring completed during the SC, suggesting that the deposit is continuous across the site. As observed during the Fourth Street Utility Corridor Excavation, some areas of this deposit are primarily comprised of clay. The clay-rich areas of the alluvium are expected to be confining with respect to downward DNAPL movement. The thickness of the alluvium ranges from 7 to 18 feet.

Bedrock was encountered at a depth of 21 to 25 ft bgs. Based on a review of geologic mapping, the bedrock beneath the Site area is the Ordovician-aged Onondaga limestone (Rickard, L. V. and Fisher, D. W., 1970.).

The cross-sections on Figures 3 and 4 show the vertical distribution of these units in the Site area. The locations of the cross-sections are shown on Figure 2.

3.2 Groundwater Flow and Hydrogeologic Characterization

The hydrogeology at the Site has been characterized based on information obtained from the four monitoring wells installed as part of the SC. Monitoring wells AW-01, AW-02 and AW-04 were screened in native alluvium and AW-03 was screened partially in fill and native alluvium. Well construction details are summarized in Table 2. As shown in the table below, the hydraulic conductivity measured at the SC monitoring wells varies by two orders of magnitude. This is expected due to the highly variable grains size observed in the fill and underlying alluvium. The hydraulic conductivity measured at monitoring wells AW-01 and AW-02 is approximately two orders of magnitude lower than that of monitoring well AW-03. The hydraulic conductivity measured at these wells is directly proportional to the amount of finer grained material observed in the well screen interval: silt and clay was observed throughout the majority of the well screen at AW-01 and AW-02 and coarse gravel was observed throughout upper 5 feet of the well screen at AW-03. Groundwater movement will favor the more permeable sand and gravel deposits.

Well ID	Screened Interval (ft bgs)	Estimated Hydraulic Conductivity (ft/day)
AW-01	13.5 – 23.5	2.0
AW-02	11 - 21	2.4
AW-03	9 - 19	125
AW-04	12.5 – 22.5	**

Notes:
Hydraulic conductivity values based on specific capacity test data measured on August 22, 2012 and December 28, 2012.
ft bgs = feet below ground surface.
** A hydraulic conductivity value could not be calculated at AW-04 due to an erroneous data set.

Water levels were measured at the four new monitoring wells (AW-01 to AW-04) and two existing monitoring wells (MW-01 and MW-08) on December 28, 2012, February 18, 2013, March 6, 2013, and August 27, 2013 (Table 3). As shown in Table 3, the water table beneath the Site is encountered at approximately 6 to 10 ft bgs, within the fill materials. The water levels measured on February 18, 2013 were converted to elevations and used to prepare the groundwater contours presented on Figure 5. As shown on Figure 5, there is a pronounced groundwater mound near AW-03 and MW-08. The water level at these two wells is approximately 4 feet higher than levels measured at the four other monitoring wells. The same trend was observed during all three measurement rounds, suggesting that the mounding is relatively continuous. The source of the mounding was not identified during this investigation but could be

associated with a leaking water line located adjacent to Fourth Street. As further shown on Figure 5, the water level measured at monitoring well AW-02 (southwest corner of the site) was the lowest during each event. This suggests that overall groundwater flow direction is to the west-southwest. This is not surprising because the nearest surface water body, Niagara River/Lake Erie confluence, is to the west of the Site.

3.3 Soil Quality

3.3.1 Field Observations of Potential Impacts

MGP-related wastes were not observed at any soil boring or monitoring well location installed as part of the SC. The only visual indications of potential impacts (black staining) in the subsurface were observed in soil borings AW-04 at 20 to 21 ft bgs and AB-04 at 10 to 12 ft bgs, on the east side of the Site. A trace sheen was also observed on a soil sample collected from 12.3 to 12.5 ft bgs at soil boring AB-04. The highest PID reading recorded during the investigation was 14.1 ppm at soil boring AW-02 from 18 to 19 ft bgs.

3.3.2 Soil Analytical Results

Up to three soil samples were collected for laboratory analysis from each of the ten soil borings (21 total samples) during the SC. As previously mentioned, the samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals, total cyanide, and free cyanide. The results of these chemical analyses are presented in Table 4 and on Figure 6 in comparison to the NYSDEC Part 375 Restricted-Use Residential Soil Cleanup Objectives (RSCOs) and Restricted-Use Commercial Soil Cleanup Objectives (CSCOs).

As shown in Table 4 and on Figure 6, only four of the 21 soil samples contained concentrations of potential MGP-related constituents (PAHs) exceeding the RSCOs or CSCOs. These four samples were collected from soil borings AB-01 (20-22 ft bgs), AW-02 (18-21 ft bgs), AB-03 (8 -10 ft bgs), and AW-04 (4-8 ft bgs). As further shown in Table 4 and on Figure 6, only concentrations of a few PAH compounds exceeded these SCOs. Total PAH concentrations for these samples ranged from 18 mg/kg at AW-04 (4-8 ft bgs) to 110 mg/kg at AW-02 (18-21 ft bgs).

BTEX and cyanide were not detected at levels exceeding the SCOs. BTEX compounds were detected in 11 of the 21 samples at total BTEX concentrations ranging from 0.0017 mg/kg at AW-01 (5-7 ft bgs) to 0.067 mg/kg at AW-02 (18 -21 ft

bgs). Total cyanide was detected in 8 of the 21 samples at concentrations ranging from 0.62 mg/kg at AB-01 (8-14 ft bgs) to 3.8 mg/kg at AW-04 (4-8 ft bgs).

As shown in Table 4, three of the 21 samples contained arsenic and/or mercury at levels exceeding the RSCOs and CSCOs. These samples were collected from AB-01 (20-22 ft bgs), AW-02 (8-10 ft bgs), and AW-02 (18-21 ft bgs).

3.4 Groundwater Quality

Two rounds of groundwater samples were collected from each of the four new SC monitoring wells. AW-01 and AW-02 were sampled on August 22, 2012 and August 27, 2013, and AW-03 and AW-04 were sampled on December 28, 2012 and August 27, 2013. All samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals, and total cyanide. The samples collected in 2012 were also analyzed for free cyanide. The groundwater sampling results in comparison to NYSDEC TOGS 1.1.1 Class GA Ambient Water Quality Standards and Guidance Values (Class GA Standards and Guidance Values) are presented in Table 5. The groundwater analytical results for common MGP-related constituents (BTEX, PAHs, and cyanide), are show in plan view on Figure 7.

As shown in Table 5, benzene (a VOC) was detected above its Class GA Standard in groundwater sampled from AW-03 during both sampling rounds. Three VOCs (benzene, ethylbenzene, and xylenes) were detected at concentrations above Class GA Standards in samples collected from monitoring well AW--04. AW-04 is located just outside the Fourth Street Utility Corridor Excavation and southeast of the former slip, and AW-03 is located in the approximate terminus of former slip, within the eastern half of the Site. Groundwater sampled from AW-01 and AW-02, which are downgradient from AW-03 and AW-04, did not contain VOCs at concentrations above Class GA Groundwater Standards. The only other VOC detected in groundwater was methylene chloride, which was detected below Class GA Standard in AW-03 during the 2012 sampling round.

Trace concentrations of SVOCs (which include PAHs) were detected in groundwater from each well during both sampling events. Acenaphthene and/or benzo(a)anthracene (both PAHs) were detected in AW-03 during at least one of the sampling rounds at concentrations above the Class GA Guidance Value for these compounds. Naphthalene and phenol were also detected above the Class GA Guidance Values in the groundwater sample collected from AW-04 during the August

27, 2013 round. Groundwater from AW-01 and AW-02 did not contain concentrations of SVOCs above Class GA Standards during either sampling event.

Metals were detected above Class GA Standards in groundwater from each well during both sampling events. Groundwater samples from one or more monitoring wells contained concentrations of barium, iron, magnesium, manganese, and sodium above the Class GA Standards.

Trace levels of total cyanide were detected in AW-01, AW-03, and AW-04, but at concentrations below the Class GA Standard of 200 ug/L. Free cyanide was detected in the duplicate sample collected from AW-03, but at a concentration well below the Class GA Standard.

3.5 Sewer Assessment

An evaluation was conducted to determine if the 11.5 foot diameter combined sewer located beneath the I-190 overpass could be impacted by MGP- related residuals (principally, coal tar) from the Site, and whether such impacts (if any) could pose a risk for direct discharge to surface water bodies. As part of this effort, information regarding the construction and function of the sewer was obtained and evaluated. The results of the sewer assessment were previously presented in a September 25, 2013 letter to the NYSDEC and have since been updated based on new information provided by the City of Buffalo in February 2015. A summary of the information reviewed is presented below.

Much of the information regarding the sewer was gleaned from:

- Drawings obtained from the Buffalo Sewer Authority (BSA) for the South Interceptor (SI), titled *Buffalo Sewer Authority Intercepting Sewer, Division H, Canal Section*, dated April 1936.

- Drawings from the City of Buffalo titled *Waterfront Redevelopment Project No. N.Y. R-35, Utility Replacement Contract, 1975*.

A copy of the drawings is included as Appendix E. It should be noted that the documents obtained from the BSA and City and reviewed for this assessment are assumed to represent as-built conditions. Additional information that supplements the design drawings is also provided based on ARCADIS' institutional knowledge of the BSA's combined sewer system. ARCADIS provides engineering consulting services to

the BSA including hydraulic modeling associated with the development of the BSA's long term control plan (LTCP) for combined sewer overflows (CSOs). In addition to the sewer information, knowledge obtained during the subsurface SC activities and soil excavation activities completed during the Fourth Street Utility Corridor Excavation was also considered.

The following bullets summarize the relevant information from these sources.

- The sewer that runs beneath the northbound lane of the I-190 overpass and through the Site is named the South Interceptor (SI). The SI collects sanitary and storm water runoff (i.e., combined sewer) from the southwest portion of the City of Buffalo. The SI was constructed in the late 1930s within the eastern edge of the Former Erie Canal.

- The SI begins at Charles Street, flows northward, and terminates at Breckenridge Street, where it joins the North Interceptor. From this junction, the sewer runs west beneath the Black Rock Canal to Bird Island (a.k.a., Squaw Island), where is terminates at the BSA Sewage Treatment Plant. The total length of the SI is approximately 6 miles with roughly 2.5 miles of the interceptor downstream from the Site.

- The SI is not constructed with outfalls to surface water bodies (i.e., Niagara River/Lake Erie/Black Rock Canal) because the SI does not have an overflow component. All flow within the SI reaches the BSA Sewage Treatment Plant on Bird Island.

- The Site area is located near Station 70 on Sheet No. 8 of the design drawings (Appendix E).

- The SI is approximately 11.5 feet in diameter and the invert of the sewer in the Site area is approximately 19 feet below grade. The design drawings show that the SI was likely constructed with a top section and bottom section that are 18-inches in thickness. The joints between the sections consist of 10-gauge copper plates with an asphalt coating. The bottom of the SI is constructed on or near the bedrock surface.

- The design drawings indicate that in the area of the Site, the bottom of the pipe is approximately 3 feet lower than the original bedrock surface, suggesting that a portion of the bedrock was removed during installation of the SI.

- As further shown on the design drawings, the sections of the SI that are incised in the bedrock were designed and presumably constructed with an under-drain system that ties into drain sumps. The BSA and ARCADIS could not determine the purpose of the under-drain system, but ARCADIS suspects that the drains may have been used to dewater the open excavations during sewer installation. The BSA could not confirm whether the drain sumps still exist.

- Comparing the water surface elevation in the SI during average flow conditions (as obtained from system modeling associated with the LTCP) with the groundwater elevation at the Site obtained during the SC fieldwork, the sewage in the SI is approximately 6 feet below the water table during average sewer flow conditions.

- Based on communications with the BSA, the BSA has never visually inspected the section of the SI in the Site area.

4. Summary and Conclusions

This section presents conclusions that are supported by the SC investigation results discussed in Section 3. As summarized in Section 1, the objectives of the SC investigation include:

- Assess whether MGP-related residual materials are present at the Site that are related to operation of the former BSS site.
- Determine whether MGP-related residual materials, if present at the Site, have a potential to pose a significant threat to public health or the environment.
- Determine whether a Remedial Investigation of the Site is appropriate.

The results of the SC investigation activities described in this report satisfy these objectives as discussed further below.

4.1 Summary of SC Activities

The SC field investigations consisted of:

- Conducting a background investigation consisting of a utility mark-out, reviewing as-built drawings, and a geophysical survey.
- Drilling ten soil borings: seven on the NYSTA property and three on the City of Buffalo property.
- Converting four soil borings to monitoring wells AW-01 through AW-04.
- Collecting up to three soil samples from each soil boring (total of 21 soil samples and 2 duplicate samples) for analysis of TCL VOCs, TCL SVOCs, TAL Metals, total cyanide, and free cyanide.
- Collecting two rounds of groundwater samples from each of the four new monitoring wells for analysis of TCL VOCs, TCL SVOCs, TAL Metals, total cyanide, and free cyanide.

- Measuring water levels at monitoring wells AW-01 through AW-04, MW-01, and MW-08 on December 28, 2012, February 18, 2013, March 3, 2013, and August 27, 2013.

- Conducting an assessment of the 11.5-foot diameter sewer beneath the northbound lane of the I-190 overpass to evaluate the potential for Site-related impacts to the sewer.

- Surveying all SC investigation locations relative to a common datum.

Soil borings were drilled to bedrock refusal at approximately 21 to 25 feet below grade, depending on location. Each of the four monitoring wells was installed using schedule 40 PVC and 10-foot long, 0.01-inch slotted well screens. The bottoms of the well screens were positioned above the bedrock surface. The locations of the soil borings and monitoring wells are shown on Figure 2. Soil boring and monitoring well construction logs are provided in Appendix A.

Collected soil and groundwater samples were analyzed for:

- VOCs by USEPA Method 8260B

- SVOCs by USEPA Method 8270C

- TAL Metals by USEPA Method 6000/7000

- total cyanide by USEPA Method 9012A

- free cyanide by USEPA extraction Method 9016 and analysis by microdiffusion using ASTM method D4282-02

4.2 Summary of SC Findings

The relevant findings of the SC investigation are summarized below, including a summary discussion of the Site setting and history, geologic and hydrogeologic conditions, soil sampling results, and groundwater sampling results.

4.2.1 Site Setting and History

The Site was historically the confluence of the former Wilkeson Slip and the former Erie Canal and Fourth Street. The former Erie Canal was filled in in the 1930's by the WPA, and the former Wilkeson Slip was filled in between 1895 and 1915. The Site is approximately 120 feet by 180 feet and extends from the eastern edge of Fourth Street, under and to the southwest edge of the NYS Interstate I-190 overpass in Buffalo, New York. The portion of the Site that lies beneath Fourth Street is owned by the City of Buffalo, while the portion beneath the I-190 overpass is owned by the NYSTA. An approximate 11.5-foot diameter sewer runs parallel with and beneath the northbound lane of the I-190 overpass, bisecting the Site. An approximate 15-inch diameter reinforced concrete storm sewer pipe, situated approximately 1.5 ft bgs, runs parallel with and beneath the northbound lane of Fourth Street in the eastern portion of the Site. A 23-kilovolt electrical line (encased in a concrete duct bank) roughly bisects the site in the east-west direction. The western boundary of the Site is denoted by a chain-link fence that runs between the site and the railroad.

The Site is located adjacent to the western edge of the former BSS site. As shown on Figure 2, Wilkeson Slip is located northwest and adjacent to the former BSS site. Previous investigations and remedial actions at the former BSS site indicated that MGP-related impacts (primarily coal tar) were observed within the limits of the former Wilkeson Slip. These impacts were observed to extend in the direction of the Site and potentially beneath the eastern edge of Fourth Street (i.e., beneath the Site). An excavation (i.e., Fourth Street Utility Corridor Excavation) completed by WSP on behalf of QLT Buffalo LLC between June and September 2012 removed the coal tar within the slip extending to the edge of the Site (i.e., edge of Fourth Street). The limits of the excavation are shown as Cell's A and B on Figure 2.

4.2.2 Geologic and Hydrogeologic Conditions

The SC identified two principal geologic units beneath the Site: a fill unit underlain by an alluvial deposit. The fill unit is up to approximately 6 to 21 feet in thickness, and consists of silt, clay, fine to coarse sand, fine to coarse gravel, slag, and bricks. The native alluvial deposit consisting of clay, silt, fine sand, and gravel is approximately 7 to 18 feet thick. Bedrock was encountered at a depth of 21 to 25 ft bgs.

The water table is encountered at approximately 6 to 10 ft bgs. Groundwater flow is generally to the southwest across the Site in the direction of the Niagara River/Lake

Erie confluence. A groundwater mound with somewhat radial flow is observed near MW-08 and AW-03, suggesting a possible water line leak in the area.

4.2.3 Field Observations of Potential Impacts

The only visual indications of potential impacts to the subsurface observed during the SC was black staining in soil boring AW-04 at 20 to 21 ft bgs and soil boring AB-04 at 10 to 12 ft bgs grade and trace sheen at AB-04 from 12.3 to 12.5 ft bgs, at the eastern edge of the Site. Although obvious MGP-related impacts (i.e., coal tar, MGP-like odors, purifier waste) were not observed during the SC activities, MGP-related impacts were observed during previous investigations/ remedial activities completed at/near the Site, as follows:

- Observations made during the 2012 Fourth Street Utility Corridor Excavation (excavation limits shown on Figure 2 as Cells A and B) suggest that coal tar is located beneath Fourth Street (and within the limits of the slip). Coal tar was observed to enter the excavation at approximately 18 ft bgs from beneath the eastern edge of Fourth Street. Coal tar was not observed outside the west and east edges of the slip during the excavation. In addition, coal tar was observed within the excavation at approximately 15 to 18 ft bgs above an approximately 3 to 5 foot thick clay unit (assumed to be the native alluvium). The clay unit lies directly on the bedrock surface. Coal tar was not observed below the clay surface.

- Observations at one boring (RB-37; Figure 2) completed in 2003 in connection with the investigation of the Former BSS site indicate that coal tar is potentially located in an isolated region along the western edge of Fourth Street. During the drilling of RB-37, “hydrocarbon-like odor and sheen” was observed at depths of 12 to 16 ft bgs and “visible NAPL blebs” were observed from 18 to 19 ft bgs. In addition, as shown on Figure 6, elevated levels of PAHs were detected in an analytical sample collected from the soil interval containing these impacts.

4.2.4 Soil Analytical Results

Soil sampling analytical results are presented in Table 4 in comparison to the RSCOs and CSCOs. The soil analytical results for the typical MGP-related constituents (BTEX, PAHs, and cyanide) are shown in plan view on Figure 6. A summary of the soil sampling results is provided below.

- None of the soil samples contained VOC concentrations above the SCOs.

- Four soil samples collected from soil borings AB-01, AW-02, AB-03, and AW-04 contained trace concentrations of PAHs slightly above applicable SCOs. The highest levels of PAHs were detected in the interval above the bedrock in the two westernmost (farthest from the former slip) soil borings. The other two samples were collected from within the fill material.

- Metals were detected in all soil samples, but only three samples contained concentrations above SCOs. These soil samples were also collected from the westernmost soil borings.

- Total or free cyanide were not detected in soil samples at concentrations above SCOs.

4.2.5 Groundwater Analytical Results

The groundwater sampling results in comparison to NYSDEC Class GA Standards and Guidance Values are presented in Table 5. The groundwater analytical results for the typical MGP-related constituents (BTEX, PAHs, and cyanide) are show in plan view on Figure 7. A summary of the groundwater sampling results is provided below.

- One VOC (benzene) was detected at a concentration above Class GA Standards in samples collected from monitoring well AW-03. Three VOCs (benzene, ethylbenzene, and xylenes) were detected at concentrations above Class GA Standards in samples collected from monitoring well AW--04. AW-04 is located just outside the Fourth Street Utility Corridor Excavation and southeast of the former slip, and AW-03 is located in the approximate terminus of former slip, within the eastern half of the Site. Groundwater sampled from AW-01 and AW-2, which are downgradient from AW-03 and AW-04, did not contain VOCs above Class GA Groundwater Standards.

- Acenaphthene and benzo(a)anthracene were detected in groundwater from AW-03 at concentrations above the Class GA Guidance Values. Naphthalene and phenol were detected in groundwater from AW-04 at concentrations above the Class GA Guidance Values. PAHs were not detected at concentrations above Class GA Standards or Guidance Values in groundwater samples collected from wells AW-01 and AW-02.

- Metals were detected in all groundwater samples above Class GA Standards. The metals detected include: barium, iron, magnesium, manganese, and sodium.

- Total and/or free cyanide was detected in groundwater from AW-01, AW-03, and AW-04, but at concentrations well below the NYSDEC Class GA Standard.

4.3 Sewer Assessment

The following conclusions are made based on the information reviewed and assumptions made during the assessment of the 11.5- foot diameter SI:

- *The SI is Relatively "Water Tight"*: The SI is a semi-elliptical structure formed with a top and bottom section that are constructed with 18-inches of reinforced concrete, and the joints between the sections are sealed with a 10-gauge copper plate and asphalt coating. This construction is substantial compared to a brick-and-mortar structure that is often associated with sewers of this age. The SI is likely relatively "water-tight" compared to typical brick-and-mortar type structures. A review of the groundwater contours presented on Figure 7 indicates that the Site groundwater table is not depressed in the area of the SI. This indicates that, if the SI was collecting groundwater, it is not having a significant effect on the groundwater level. This further implies that the amount of groundwater collected by the SI in the Site area (if any) is likely negligible.

- *Coal Tar should not be in Contact with the Sewer*: Since the sewer is located in an area of the Site where coal tar has not been observed, it is not likely that coal tar is in contact with the sewer. In the unlikely event that coal tar or impacted groundwater were to enter the SI, the volume of sewage flowing through the SI especially during wet weather would overwhelm any potential influence the coal tar may have on the quality of water in the sewer (which is likely already impacted by general sewage waste).

- *Site Impacts Would Not Be Discharged to a Surface Water Without Treatment*: Since the SI does not have a CSO between the Site and the BSA Sewage Treatment Plant on Bird Island, any potential coal tar entering the SI would not be discharged to a surface water body (i.e., Black Rock Canal) but rather would receive some form of treatment at the BSA's treatment plant.

4.4 Conclusion

Concentrations of PAHs and metals were detected in 4 of 21 SC soil samples at levels above applicable NYSDEC criteria. This is not surprising since PAHs are formed during the incomplete combustion of fossil fuels, garbage, or any other organic matter; consequently, PAHs are ubiquitous, especially in urban environments like the City of Buffalo. The presence of PAHs, combined with the absence of visual impacts and elevated non-MGP related metal concentrations, is expected due to the abundant fill resulting from the filling of the former Erie Canal in the Site area. Although the low-level PAHs detected in SC soil samples do not appear to be related to the former MGP, one sample collected from boring RB-37 (during an investigation completed in 2003) contained elevated levels of PAHs that are likely due to the potential presence of coal tar observed in the sample.

Some BTEX and/or PAH compounds were detected above Class GA Standards in groundwater from two SC monitoring wells located within and near the former Wilkeson Slip (i.e., AW-03 and AW-04, east portion of the Site). These detections are possibly associated with the dissolution of MGP-related impacts (principally coal tar) observed beneath the eastern edge of Fourth Street (observed during the Fourth Street Utility Corridor Excavation) and at soil boring RB-37 (installed at the western edge of Fourth Street during a 2003 investigation). The elevated levels of BTEX and PAHs in groundwater appears to be constrained to the eastern portion of the Site as groundwater sampled in wells downgradient (west) from this area does not contain elevated BTEX or PAH concentrations.

Given the information presented in this SC Report, it is possible that a small region of residual coal tar remains within the limits of the former slip beneath Fourth Street. Although coal tar may be present beneath Fourth Street, the results of the SC indicate that the tar (and related dissolved-phase impacts from the tar) is not present in the portion of the Site west of Fourth Street (underneath the I-190 overpass). The potential tar may extend from beneath the eastern edge of Fourth Street (from the west side of the Fourth Street Utility Corridor Excavation sheeting) to the western edge of Fourth Street (area around RB-37). Information obtained during the SC suggests that tar should not be in contact with the 11.5–foot diameter SI sewer located beneath the northbound lane of the I-190 overpass because tar has not been observed in the area below the overpass. Design drawings and information obtained from the BSA suggest that if tar or impacted groundwater were to enter the sewer (which is not likely), any impacts would be negligible due to the volume of sewage

flowing through the sewer and because the sewer does not have a surface water overflow component.

ARCADIS concludes that any potential exposure of humans or wildlife to potential impacts beneath Fourth Street is minimal because any residual coal tar located within the former slip is located approximately 15 to 19 feet beneath a heavily traveled street, which adjoins the underpass to the NYSTA 190 North. Any such residual is below the reach of normal utility and road maintenance or replacement activities. Furthermore, potable water within the City limits is provided by a public source.

Given the limited extent of MGP-related impacts to soil and groundwater beneath the Site and the lack of potential human or wildlife exposure to these impacts, ARCADIS concludes that a Remedial Investigation (RI) is not warranted for the Site.

5. References

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ARCADIS

Tables

Table 1
Sample Summary

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Matrix	Location ID	Depth Range (feet)	Date Collected	TCL VOCs	TCL SVOCs	TAL Metals	Free Cyanide	Total Cyanide
Groundwater	AW-01	13.5-23.5	8/22/2012	X	X	X	X	X
	AW-01 (DUP)	13.5-23.5	8/22/2012	X	X	X	X	X
	AW-01	13.5-23.5	8/27/2013	X	X	X	NA	X
	AW-02	11-21	8/22/2012	X	X	X	X	X
	AW-02	11-21	8/27/2013	X	X	X	NA	X
	AW-03	9-19	12/28/2012	X	X	X	X	X
	AW-03 (DUP)	9-19	12/28/2012	X	X	X	X	X
	AW-03	9-19	8/27/2013	X	X	X	NA	X
	AW-03(DUP)	9-19	8/27/2013	X	X	X	NA	X
	AW-04	12.5-22.5	12/28/2012	X	X	X	NA	X
	AW-04	12.5-22.5	8/27/2013	X	X	X	X	X
Subsurface Soil	AB-01	8-14	8/2/2012	X	X	X	X	X
	AB-01	20-22	8/2/2012	X	X	X	X	X
	AB-02	8-10	8/3/2012	X	X	X	X	X
	AB-02	20-22	8/3/2012	X	X	X	X	X
	AB-03	8-10	8/6/2012	X	X	X	X	X
	AB-03	20-22.5	8/6/2012	X	X	X	X	X
	AB-04	10-12	8/3/2012	X	X	X	X	X
	AB-04	18-21	8/3/2012	X	X	X	X	X
	AB-05	9.5-10.8	8/1/2012	X	X	X	X	X
	AB-05	22-25	8/1/2012	X	X	X	X	X
	AB-C2	8-11	8/6/2012	X	X	X	X	X
	AB-C2	22-24	8/6/2012	X	X	X	X	X
	AW-01	5-7	8/2/2012	X	X	X	X	X
	AW-01 (DUP)	5-7	8/2/2012	X	X	X	X	X
	AW-01	20-22.5	8/2/2012	X	X	X	X	X
	AW-02	8-10	8/2/2012	X	X	X	X	X
	AW-02	18-21	8/2/2012	X	X	X	X	X
	AW-03	4-8	11/11/2012	X	X	X	X	X
	AW-03	18-20	11/11/2012	X	X	X	X	X
	AW-03	20-22	11/11/2012	X	X	X	X	X
	AW-04	22-22.5	11/11/2012	X	X	X	X	X
	AW-04	4-8	11/11/2012	X	X	X	X	X
	AW-04 (DUP)	4-8	11/11/2012	X	X	X	X	X

Notes:
Depth range is feet below ground surface.
Depth range for groundwater samples is equivalent to the monitoring well screened interval
DUP: Duplicate sample collected at this location.
SVOCs: Semi-Volatile Organic Compounds.
TAL: Target Analyte List.
TCL: Target Compound List.
VOCs: Volatile Organic Compounds.
NA: Not Analyzed.

Table 2
Monitoring Well Construction Details

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID	Date Completed	Well Diameter (in.)	Casing / Screen Type	Screen Slot Size (in.)	Screen Length (ft.)	Screened Interval (ft. bgs)	
						Top	Bottom
AW-01	8/2/2012	2	PVC	0.01	10.0	13.5	23.5
AW-02	8/3/2012	2	PVC	0.01	10.0	11.0	21.0
AW-03	11/11/2012	2	PVC	0.01	10.0	9.0	19.0
AW-04	11/12/2012	2	PVC	0.01	10.0	12.5	22.5

Notes:
Depths of screened interval are feet below ground surface (ft. bgs).
ft.: feet.
in.: inches.
PVC: polyvinyl chloride.

Table 3
Groundwater Elevations

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Well ID	Measuring Point Elevation	Depth to Water (ft. below measuring point)	Groundwater Elevation	Depth to Water (ft. below measuring point)	Groundwater Elevation	Depth to Water (ft. below measuring point)	Groundwater Elevation	Depth to Water (ft. below measuring point)	Groundwater Elevation
		12/28/2012		2/18/2013		3/6/2013		8/27/2013	
AW-01	580.21	9.40	570.81	9.14	571.07	9.34	570.87	8.38	571.83
AW-02	580.22	9.45	570.77	9.38	570.84	9.41	570.81	8.90	571.32
AW-03	581.44	6.79	574.65	6.54	574.90	6.49	574.95	6.55	574.89
AW-04	581.95	10.71	571.24	10.12	571.83	10.56	571.39	9.57	572.38
MW-01	581.04	10.50	570.54	9.80	571.24	9.96	571.08	8.98	572.06
MW-08	583.44	8.32	575.12	7.65	575.79	7.70	575.74	9.00	574.44

Notes:
Elevations are referenced to NAVD 88.

Table 4
Summary of Soil Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID:		Restricted	Restricted	AB-01	AB-01	AB-02	AB-02	AB-03	AB-03-	AB-04	AB-04	AB-05	AB-05	AB-C2
Sample Depth(Feet):		Use SCOs	Use SCOs	8 - 14	20 - 22	8 - 10	20 - 22	8 - 10	20 - 22.5	10 - 12	18 - 21	9.5 - 10.8	22 - 25	8 - 11
Date Collected:	Units	Residential	Commercial	08/02/12	08/02/12	08/03/12	08/03/12	08/06/12	08/06/12	08/03/12	08/03/12	08/01/12	08/01/12	08/06/12
Volatile Organics														
1,1,1-Trichloroethane	mg/kg	100	500	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,1,2,2-Tetrachloroethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,1,2-trichloro-1,2,2-trifluoroethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,1,2-Trichloroethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,1-Dichloroethane	mg/kg	26	240	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,1-Dichloroethene	mg/kg	100	500	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,2,4-Trichlorobenzene	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0022 J	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,2-Dibromo-3-chloropropane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,2-Dibromoethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,2-Dichlorobenzene	mg/kg	100	500	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,2-Dichloroethane	mg/kg	3.1	30	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,2-Dichloropropane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,3-Dichlorobenzene	mg/kg	49	280	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
1,4-Dichlorobenzene	mg/kg	13	130	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0015 J	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
2-Butanone	mg/kg	100	500	0.029 U	0.13 J	0.03 U	0.031 U	0.026 U	0.023 J	0.26 U	0.029 U	0.0069 J	0.15	0.016 J
2-Hexanone	mg/kg	- -	- -	0.029 U	0.3 U	0.03 U	0.031 U	0.026 U	0.031 U	0.26 U	0.029 U	0.031 U	0.03 U	0.031 U
4-Methyl-2-pentanone	mg/kg	- -	- -	0.029 U	0.3 U	0.03 U	0.031 U	0.0026 J	0.031 U	0.26 U	0.029 U	0.031 U	0.03 U	0.031 U
Acetone	mg/kg	100	500	0.029 UB	0.39	0.011 J	0.019 J	0.011 J	0.015 J	0.093 J	0.0095 J	0.04 UB	0.03 UB	0.039
Benzene	mg/kg	4.8	44	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0011 J	0.0062 U	0.0059 U	0.0063 U
Bromodichloromethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Bromoform	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Bromomethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 UJ	0.0061 UJ	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 UJ
Carbon Disulfide	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Carbon Tetrachloride	mg/kg	2.4	22	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Chlorobenzene	mg/kg	100	500	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Chloroethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 UJ	0.0061 UJ	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 UJ
Chloroform	mg/kg	49	350	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Chloromethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
cis-1,2-Dichloroethene	mg/kg	100	500	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
cis-1,3-Dichloropropene	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Cyclohexane	mg/kg	- -	- -	0.011	0.023 J	0.001 J	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Dibromochloromethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Dichlorodifluoromethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 UJ	0.0061 UJ	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 UJ
Ethylbenzene	mg/kg	41	390	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0015 J	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Isopropylbenzene	mg/kg	- -	- -	0.0057 U	0.053 J	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Methyl acetate	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0049 J	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Methyl tert-butyl ether	mg/kg	100	500	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Methylcyclohexane	mg/kg	- -	- -	0.013	0.056 J	0.002 J	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Methylene Chloride	mg/kg	100	500	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U

See Notes on Page 9.

Table 4
Summary of Soil Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID:		Restricted	Restricted	AB-01	AB-01	AB-02	AB-02	AB-03	AB-03-	AB-04	AB-04	AB-05	AB-05	AB-C2
Sample Depth(Feet):		Use SCOs	Use SCOs	8 - 14	20 - 22	8 - 10	20 - 22	8 - 10	20 - 22.5	10 - 12	18 - 21	9.5 - 10.8	22 - 25	8 - 11
Date Collected:	Units	Residential	Commercial	08/02/12	08/02/12	08/03/12	08/03/12	08/06/12	08/06/12	08/03/12	08/03/12	08/01/12	08/01/12	08/06/12
Volatile Organics (Cont.)														
Styrene	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Tetrachloroethene	mg/kg	19	150	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.00072 J	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Toluene	mg/kg	100	500	0.0017 J	0.06 U	0.0059 U	0.0062 J	0.0012 J	0.0061 U	0.053 U	0.0036 J	0.0062 U	0.0059 U	0.0063 U
trans-1,2-Dichloroethene	mg/kg	100	500	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
trans-1,3-Dichloropropene	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Trichloroethene	mg/kg	21	200	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Trichlorofluoromethane	mg/kg	- -	- -	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 UJ	0.0061 UJ	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 UJ
Vinyl Chloride	mg/kg	0.9	13	0.0057 U	0.06 U	0.0059 U	0.0063 U	0.0052 U	0.0061 U	0.053 U	0.0058 U	0.0062 U	0.0059 U	0.0063 U
Xylenes (total)	mg/kg	100	500	0.0012 J	0.12 UB	0.012 U	0.013 U	0.0083 J	0.012 UB	0.11 U	0.012 U	0.012 U	0.012 U	0.013 UB
Total BTEX	mg/kg	- -	- -	0.0029 J	ND	ND	0.0062 J	0.011 J	ND	ND	0.0047 J	ND	ND	ND
Total VOCs	mg/kg	- -	- -	0.0269 J	0.652 J	0.014 J	0.0252 J	0.02902 J	0.0429 J	0.093 J	0.0142 J	0.0069 J	0.15	0.055 J
Semivolatile Organics														
1,1'-Biphenyl	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.031 J	0.2 U	0.21 U	0.2 U	1.1 U
2,2'-Oxybis(1-Chloropropane)	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2,4,5-Trichlorophenol	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2,4,6-Trichlorophenol	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2,4-Dichlorophenol	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2,4-Dimethylphenol	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2,4-Dinitrophenol	mg/kg	- -	- -	3.8 U	4.8 U	3.9 U	0.42 U	7 U	0.4 U	0.41 U	0.39 U	0.41 U	0.39 U	2.1 U
2,4-Dinitrotoluene	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2,6-Dinitrotoluene	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2-Chloronaphthalene	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2-Chlorophenol	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2-Methylnaphthalene	mg/kg	- -	- -	1.9 U	0.46 J	2 U	0.22 U	3.6 U	0.2 U	0.037 J	0.2 U	0.21 U	0.2 U	1.1 U
2-Methylphenol	mg/kg	100	500	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
2-Nitroaniline	mg/kg	- -	- -	3.8 U	4.8 U	3.9 U	0.42 U	7 U	0.4 U	0.41 U	0.39 U	0.41 U	0.39 U	2.1 U
2-Nitrophenol	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
3,3'-Dichlorobenzidine	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
3-Nitroaniline	mg/kg	- -	- -	3.8 U	4.8 U	3.9 U	0.42 U	7 U	0.4 U	0.41 U	0.39 U	0.41 U	0.39 U	2.1 U
4,6-Dinitro-2-methylphenol	mg/kg	- -	- -	3.8 U	4.8 U	3.9 U	0.42 U	7 U	0.4 U	0.41 U	0.39 U	0.41 U	0.39 U	2.1 U
4-Bromophenyl-phenylether	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
4-Chloro-3-Methylphenol	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
4-Chloroaniline	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
4-Chlorophenyl-phenylether	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
4-Methylphenol	mg/kg	100	500	3.8 U	4.8 U	3.9 U	0.42 U	7 U	0.4 U	0.41 U	0.39 U	0.41 U	0.39 U	2.1 U
4-Nitroaniline	mg/kg	- -	- -	3.8 U	4.8 U	3.9 U	0.42 U	7 U	0.4 U	0.41 U	0.39 U	0.41 U	0.39 U	2.1 U
4-Nitrophenol	mg/kg	- -	- -	3.8 U	4.8 U	3.9 U	0.42 U	7 U	0.4 U	0.41 U	0.39 U	0.41 U	0.39 U	2.1 U
Acenaphthene	mg/kg	100	500	1.9 U	1.1 J	2 U	0.22 U	3.6 U	0.014 J	3.9	0.2 U	0.21 U	0.2 U	1.1 U
Acenaphthylene	mg/kg	100	500	1.9 U	0.22 J	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Acetophenone	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Anthracene	mg/kg	100	500	1.9 U	1.3 J	2 U	0.22 U	0.28 J	0.2 U	2.7	0.2 U	0.21 U	0.2 U	1.1 U

See Notes on Page 9.

Table 4
Summary of Soil Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Sample Depth(Feet): / Date Collected:	Units	Restricted Use SCOs Residential	Restricted Use SCOs Commercial	AB-01 8 - 14 08/02/12	AB-01 20 - 22 08/02/12	AB-02 8 - 10 08/03/12	AB-02 20 - 22 08/03/12	AB-03 8 - 10 08/06/12	AB-03- 20 - 22.5 08/06/12	AB-04 10 - 12 08/03/12	AB-04 18 - 21 08/03/12	AB-05 9.5 - 10.8 08/01/12	AB-05 22 - 25 08/01/12	AB-C2 8 - 11 08/06/12
Semivolatile Organics (Cont.)														
Atrazine	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Benzaldehyde	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Benzo(a)anthracene	mg/kg	1	5.6	0.29 J	3.4	2 U	0.22 U	1.1 J	0.2 U	1.2	0.2 U	0.21 U	0.028 J	1.1 U
Benzo(a)pyrene	mg/kg	1	1	0.27 J	**3.1**	2 U	0.015 J	**1.1 J**	0.025 J	0.65	0.2 U	0.022 J	0.026 J	1.1 U
Benzo(b)fluoranthene	mg/kg	1	5.6	0.45 J	4.6	2 U	0.018 J	1.4 J	0.025 J	0.98	0.2 U	0.035 J	0.039 J	0.062 J
Benzo(g,h,i)perylene	mg/kg	100	500	1.9 U	1 J	2 U	0.22 U	0.56 J	0.2 U	0.17 J	0.2 U	0.21 U	0.2 U	1.1 U
Benzo(k)fluoranthene	mg/kg	3.9	56	0.18 J	1.8 J	2 U	0.011 J	0.48 J	0.017 J	0.41	0.2 U	0.016 J	0.016 J	1.1 U
bis(2-Chloroethoxy)methane	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
bis(2-Chloroethyl)ether	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
bis(2-Ethylhexyl)phthalate	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	1.8 J	0.094 J	0.1 J	0.2 U	0.21 U	0.29	1.1 U
Butylbenzylphthalate	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Caprolactam	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Carbazole	mg/kg	- -	- -	1.9 U	0.47 J	2 U	0.22 U	3.6 U	0.2 U	0.31	0.2 U	0.21 U	0.2 U	1.1 U
Chrysene	mg/kg	3.9	56	0.29 J	3.3	0.13 J	0.017 J	1.2 J	0.025 J	0.91	0.2 U	0.026 J	0.03 J	1.1 U
Dibenzo(a,h)anthracene	mg/kg	0.33	0.56	1.9 U	0.43 J	2 U	0.22 U	0.21 J	0.2 U	0.069 J	0.2 U	0.21 U	0.2 U	1.1 U
Dibenzofuran	mg/kg	59	350	1.9 U	0.7 J	2 U	0.22 U	3.6 U	0.2 U	2.7	0.2 U	0.21 U	0.2 U	1.1 U
Diethylphthalate	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Dimethylphthalate	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Di-n-Butylphthalate	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Di-n-Octylphthalate	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.0077 J	0.2 U	0.21 U	0.2 U	1.1 U
Fluoranthene	mg/kg	100	500	0.52 J	7.2	0.16 J	0.031 J	2.2 J	0.031 J	5.3	0.2 U	0.039 J	0.044 J	1.1 U
Fluorene	mg/kg	100	500	1.9 U	1.2 J	2 U	0.22 U	3.6 U	0.2 U	4	0.2 U	0.21 U	0.2 U	1.1 U
Hexachlorobenzene	mg/kg	1.2	6	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Hexachlorobutadiene	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Hexachlorocyclopentadiene	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Hexachloroethane	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.5	5.6	1.9 U	0.98 J	2 U	0.22 U	0.49 J	0.2 U	0.17 J	0.2 U	0.21 U	0.012 J	1.1 U
Isophorone	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Naphthalene	mg/kg	100	500	1.9 U	2.1 J	2 U	0.22 U	3.6 U	0.2 U	0.057 J	0.2 U	0.21 U	0.2 U	1.1 U
Nitrobenzene	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
N-Nitroso-di-n-propylamine	mg/kg	- -	- -	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
N-Nitrosodiphenylamine	mg/kg	- -	- -	1.9 U	2.5 U	2 U*	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Pentachlorophenol	mg/kg	6.7	6.7	3.8 U	4.8 U	3.9 U	0.42 U	7 U	0.4 U	0.41 U	0.39 U	0.41 U	0.39 U	2.1 U
Phenanthrene	mg/kg	100	500	0.41 J	5.6	2 U	0.015 J	1.6 J	0.2 U	1.1	0.2 U	0.025 J	0.03 J	1.1 U
Phenol	mg/kg	100	500	1.9 U	2.5 U	2 U	0.22 U	3.6 U	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	1.1 U
Pyrene	mg/kg	100	500	0.39 J	5.6	2 U	0.028 J	1.8 J	0.03 J	3.3	0.2 U	0.03 J	0.035 J	1.1 U
Total PAHs	mg/kg	- -	- -	2.8 J	43.39 J	0.29 J	0.135 J	12.42 J	0.167 J	24.953 J	ND	0.193 J	0.26 J	0.062 J
Total SVOCs	mg/kg	- -	- -	2.8 J	44.56 J	0.29 J	0.135 J	14.22 J	0.261 J	28.1017 J	ND	0.193 J	0.55 J	0.062 J

See Notes on Page 9.

Table 4
Summary of Soil Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Sample Depth(Feet): / Date Collected:	Units	Restricted Use SCOs Residential	Restricted Use SCOs Commercial	AB-01 8 - 14 08/02/12	AB-01 20 - 22 08/02/12	AB-02 8 - 10 08/03/12	AB-02 20 - 22 08/03/12	AB-03 8 - 10 08/06/12	AB-03- 20 - 22.5 08/06/12	AB-04 10 - 12 08/03/12	AB-04 18 - 21 08/03/12	AB-05 9.5 - 10.8 08/01/12	AB-05 22 - 25 08/01/12	AB-C2 8 - 11 08/06/12
Inorganics														
Aluminum	mg/kg	- -	- -	7,390 J	8,690 J	6,500 J	11,600 J	3,300 J	11,700 J	7,550 J	6,450 J	5,230 J	3,210 J	8,520 J
Antimony	mg/kg	- -	- -	15.9 U	2.1 J	18.5 U	20 U	0.72 J	17.7 U	19.2 U	17.7 U	18.7 U	19.7 U	20.7 U
Arsenic	mg/kg	16	16	5.9	**25.8**	4.9	6	4.7	4.7	4.7	2.1 J	2.8	1.9 J	3.1
Barium	mg/kg	400	400	61.8 J	230 J	57.6 J	70.9 J	45.9 J	99.3 J	56 J	75.2 J	35 J	31.8 J	53.1 J
Beryllium	mg/kg	72	590	0.42	0.59	0.36	0.55	0.26	0.61	0.61	0.32	0.34	0.19 J	0.54
Cadmium	mg/kg	4.3	9.3	0.26	3.3	0.3	0.27	0.27	0.22 J	0.35	0.24	0.21 J	0.21 J	0.34
Calcium	mg/kg	- -	- -	65,000 J	35,200 J	107,000 J	69,400 J	152,000 J	48,900 J	11,200 J	60,000 J	2,300 J	86,800 J	3,670 J
Chromium	mg/kg	- -	- -	18.9 J	54.3 J	14.8 J	16.1 J	10.6 J	17.2 J	13.4 J	10.5 J	11.8 J	9.1 J	13.4 J
Cobalt	mg/kg	- -	- -	7.5	8.6	6.3	10.1	3.3	9.6	7.7	5.6	8.6	3.4	9.4
Copper	mg/kg	270	270	18.7	154	18.2	18.5	26.9	18.7	25.4	13	15.1	7.3	23.3
Iron	mg/kg	- -	- -	15,400 J	19,500 J	21,400 J	18,200 J	13,500 J	18,000 J	14,800 J	11,000 J	9,890 J	7,060 J	21,800 J
Lead	mg/kg	400	1,000	83 J	932 J	54.2 J	23.7 J	148 J	22.7 J	43.3 J	13.4 J	25.5 J	8.4 J	14.5 J
Magnesium	mg/kg	- -	- -	13,200	11,600	49,300	25,900	23,400	18,200	4,710	26,700	2,450	29,100	3,640
Manganese	mg/kg	2,000	10,000	317	309	443	534	250	407	203	420	96.5	232	243
Mercury	mg/kg	0.81	2.8	0.2	**4.4**	0.16	0.015 J	0.21	0.046	0.034	0.022 U	0.013 J	0.014 J	0.031
Nickel	mg/kg	310	310	19.3	37.9	17.3	23.8	11.2	22.5	23.3	12.8	19.9	8	25.6
Potassium	mg/kg	- -	- -	1,360 J	1,120 J	1,730 J	2,690 J	764 J	2,440 J	606 J	1,310 J	688	892 J	976 J
Selenium	mg/kg	180	1,500	4.2 U	1.8 J	4.9 U	5.3 U	4.6 U	4.7 U	5.1 U	4.7 U	5 U	5.2 U	5.5 U
Silver	mg/kg	180	1,500	0.53 U	5.6	0.62 U	0.67 U	0.58 U	0.59 U	0.64 U	0.59 U	0.62 U	0.66 U	0.69 U
Sodium	mg/kg	- -	- -	996	2,330	1,400	649	1,090	1,220	546	403	108 J	376	343
Thallium	mg/kg	- -	- -	6.4 U	0.52 J	7.4 U	8 U	0.4 J	0.35 J	7.7 U	7.1 U	7.5 U	7.9 U	8.3 U
Vanadium	mg/kg	- -	- -	16.2 J	19.5 J	14.7 J	22.5 J	8.4 J	23.6 J	19.5 J	15.2 J	13.4 J	10.3 J	17.3 J
Zinc	mg/kg	10,000	10,000	94.6 J	865 J	165 J	64.6 J	137 J	63.6 J	73.7 J	49.9 J	59.2 J	40 J	71.5 J
Miscellaneous														
Cyanide	mg/kg	27	27	0.62 J	1.6	1.1 U	1.1 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.2 U
Cyanide, Free	mg/kg	- -	- -	0.12 J	0.24 J	0.13 J	0.87	0.53 UB	0.62 UB	0.71	0.56 U	0.46 J	0.55 U	0.93 UB
Percent Moisture	%	- -	- -	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Solids	%	- -	- -	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See Notes on Page 9.

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Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Sample Depth(Feet): / Date Collected:	Units	Restricted Use SCOs Residential	Restricted Use SCOs Commercial	AB-C2 22 - 24 08/06/12	AW-01 5 - 7 08/02/12	AW-01 20 - 22.5 08/02/12	AW-02 8 - 10 08/02/12	AW-02 18 - 21 08/02/12	AW-03 4 - 8 11/11/12	AW-03 18 - 20 11/11/12	AW-03 20 - 22 11/11/12	AW-04 4 - 8 11/12/12	AW-04 22 - 22.5 11/12/12
Volatile Organics													
1,1,1-Trichloroethane	mg/kg	100	500	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,1,2,2-Tetrachloroethane	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,1,2-trichloro-1,2,2-trifluoroethane	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,1,2-Trichloroethane	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,1-Dichloroethane	mg/kg	26	240	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,1-Dichloroethene	mg/kg	100	500	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 UJ]	0.0057 U
1,2,4-Trichlorobenzene	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,2-Dibromo-3-chloropropane	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,2-Dibromoethane	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,2-Dichlorobenzene	mg/kg	100	500	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 UJ]	0.0057 U
1,2-Dichloroethane	mg/kg	3.1	30	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,2-Dichloropropane	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,3-Dichlorobenzene	mg/kg	49	280	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
1,4-Dichlorobenzene	mg/kg	13	130	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
2-Butanone	mg/kg	100	500	0.2	0.028 U [0.027 U]	0.0084 J	0.031 U	0.061 J	0.029 U	0.027 U	0.028 U	0.031 U [0.027 U]	0.028 U
2-Hexanone	mg/kg	- -	- -	0.027 U	0.028 U [0.027 U]	0.033 U	0.031 U	0.31 UJ	0.029 U	0.027 U	0.028 U	0.031 U [0.027 U]	0.028 U
4-Methyl-2-pentanone	mg/kg	- -	- -	0.027 U	0.028 U [0.027 U]	0.033 U	0.031 U	0.31 UJ	0.029 U	0.027 U	0.028 U	0.031 U [0.027 U]	0.028 U
Acetone	mg/kg	100	500	0.027 U	0.013 J [0.014 J]	0.033	0.02 J	0.23 J	0.03	0.027 U	0.0066 J	0.031 U [0.027 U]	0.028 U
Benzene	mg/kg	4.8	44	0.0055 U	0.0056 U [0.0054 U]	0.002 J	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0029 J	0.0069 [0.0055 UJ]	0.0073
Bromodichloromethane	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Bromoform	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Bromomethane	mg/kg	- -	- -	0.0055 UJ	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Carbon Disulfide	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Carbon Tetrachloride	mg/kg	2.4	22	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Chlorobenzene	mg/kg	100	500	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 UJ]	0.0057 U
Chloroethane	mg/kg	- -	- -	0.0055 UJ	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Chloroform	mg/kg	49	350	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Chloromethane	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
cis-1,2-Dichloroethene	mg/kg	100	500	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 UJ]	0.0057 U
cis-1,3-Dichloropropene	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Cyclohexane	mg/kg	- -	- -	0.0055 U	0.0021 J [0.0018 J]	0.00093 J	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Dibromochloromethane	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Dichlorodifluoromethane	mg/kg	- -	- -	0.0055 UJ	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Ethylbenzene	mg/kg	41	390	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.027	0.034	0.029 J [0.002 J]	0.0059
Isopropylbenzene	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.024 J	0.0059 U	0.0099	0.017	0.0013 J [0.0055 U]	0.0016 J
Methyl acetate	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Methyl tert-butyl ether	mg/kg	100	500	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Methylcyclohexane	mg/kg	- -	- -	0.0055 U	0.0027 J [0.002 J]	0.0065 U	0.0062 U	0.016 J	0.0059 UJ	0.0053 UJ	0.0057 UJ	0.0062 UJ [0.0055 UJ]	0.0057 UJ
Methylene Chloride	mg/kg	100	500	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0031 J	0.0027 J	0.0057 U	0.0062 U [0.0037 J]	0.0057 U

See Notes on Page 9.

Table 4
Summary of Soil Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Sample Depth(Feet): / Date Collected:	Units	Restricted Use SCOs Residential	Restricted Use SCOs Commercial	AB-C2 22 - 24 08/06/12	AW-01 5 - 7 08/02/12	AW-01 20 - 22.5 08/02/12	AW-02 8 - 10 08/02/12	AW-02 18 - 21 08/02/12	AW-03 4 - 8 11/11/12	AW-03 18 - 20 11/11/12	AW-03 20 - 22 11/11/12	AW-04 4 - 8 11/12/12	AW-04 22 - 22.5 11/12/12
Volatile Organics (Cont.)													
Styrene	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Tetrachloroethene	mg/kg	19	150	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.00089 J	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 UJ]	0.0057 U
Toluene	mg/kg	100	500	0.0055 U	0.0017 J [0.0022 J]	0.00068 J	0.0062 U	0.062 UJ	0.0011 J	0.0036 J	0.0065	0.0049 J [0.0055 UJ]	0.0057 U
trans-1,2-Dichloroethene	mg/kg	100	500	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 UJ]	0.0057 U
trans-1,3-Dichloropropene	mg/kg	- -	- -	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Trichloroethene	mg/kg	21	200	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 UJ]	0.0057 U
Trichlorofluoromethane	mg/kg	- -	- -	0.0055 UJ	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Vinyl Chloride	mg/kg	0.9	13	0.0055 U	0.0056 U [0.0054 U]	0.0065 U	0.0062 U	0.062 UJ	0.0059 U	0.0053 U	0.0057 U	0.0062 U [0.0055 U]	0.0057 U
Xylenes (total)	mg/kg	100	500	0.011 UB	0.011 UB [0.011 UB]	0.013 U	0.012 U	0.067 J	0.012 U	0.011 U	0.011 U	0.0011 J [0.011 U]	0.0054 J
Total BTEX	mg/kg	- -	- -	ND	0.0017 J [0.0022 J]	0.00268 J	ND	0.067 J	0.0011 J	0.0306 J	0.0434 J	0.0419 J [0.002 J]	0.0186 J
Total VOCs	mg/kg	- -	- -	0.2	0.0195 J [0.02 J]	0.04501 J	0.02089 J	0.398 J	0.0342 J	0.0432 J	0.067 J	0.0432 J [0.0057 J]	0.0202 J
Semivolatile Organics													
1,1'-Biphenyl	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	0.32 J	0.028 J	0.012 J	0.2 U	1 U [0.077 J]	0.2 U
2,2'-Oxybis(1-Chloropropane)	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
2,4,5-Trichlorophenol	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
2,4,6-Trichlorophenol	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
2,4-Dichlorophenol	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
2,4-Dimethylphenol	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.099 J
2,4-Dinitrophenol	mg/kg	- -	- -	0.36 U	3.7 U [7.2 U]	0.43 U	2 U	5.2 U	0.4 U	0.38 U	0.39 U	2 U [1.8 UJ]	0.38 U
2,4-Dinitrotoluene	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
2,6-Dinitrotoluene	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
2-Chloronaphthalene	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
2-Chlorophenol	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
2-Methylnaphthalene	mg/kg	- -	- -	0.19 U	0.1 J [3.7 U]	0.22 U	1 U	2.9	0.098 J	0.0071 J	0.2 U	0.066 J [0.28 J]	0.2 U
2-Methylphenol	mg/kg	100	500	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
2-Nitroaniline	mg/kg	- -	- -	0.36 U	3.7 U [7.2 U]	0.43 U	2 U	5.2 U	0.4 U	0.38 U	0.39 U	2 U [1.8 U]	0.38 U
2-Nitrophenol	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
3,3'-Dichlorobenzidine	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
3-Nitroaniline	mg/kg	- -	- -	0.36 U	3.7 U [7.2 U]	0.43 U	2 U	5.2 U	0.4 U	0.38 U	0.39 U	2 U [1.8 U]	0.38 U
4,6-Dinitro-2-methylphenol	mg/kg	- -	- -	0.36 U	3.7 U [7.2 U]	0.43 U	2 U	5.2 U	0.4 U	0.38 U	0.39 U	2 U [1.8 U]	0.38 U
4-Bromophenyl-phenylether	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
4-Chloro-3-Methylphenol	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
4-Chloroaniline	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
4-Chlorophenyl-phenylether	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
4-Methylphenol	mg/kg	100	500	0.36 U	3.7 U [7.2 U]	0.43 U	2 U	5.2 U	0.4 U	0.38 U	0.39 U	2 U [1.8 U]	0.38 U
4-Nitroaniline	mg/kg	- -	- -	0.36 U	3.7 U [7.2 U]	0.43 U	2 U	5.2 U	0.4 U	0.38 U	0.39 U	2 U [1.8 U]	0.38 U
4-Nitrophenol	mg/kg	- -	- -	0.36 U	3.7 U [7.2 U]	0.43 U	2 U	5.2 U	0.4 U	0.38 U	0.39 U	2 U [1.8 U]	0.38 U
Acenaphthene	mg/kg	100	500	0.19 U	0.087 J [3.7 U]	0.017 J	1 U	2.9	0.14 J	0.41	0.12 J	0.18 J [0.97]	0.013 J
Acenaphthylene	mg/kg	100	500	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	0.89 J	0.04 J	0.0062 J	0.2 U	0.16 J [0.2 J]	0.2 U
Acetophenone	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Anthracene	mg/kg	100	500	0.19 U	0.2 J [3.7 U]	0.027 J	1 U	3.5	0.26	0.075 J	0.011 J	0.69 J [2]	0.2 U

See Notes on Page 9.

Table 4
Summary of Soil Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Sample Depth(Feet): / Date Collected:	Units	Restricted Use SCOs Residential	Restricted Use SCOs Commercial	AB-C2 22 - 24 08/06/12	AW-01 5 - 7 08/02/12	AW-01 20 - 22.5 08/02/12	AW-02 8 - 10 08/02/12	AW-02 18 - 21 08/02/12	AW-03 4 - 8 11/11/12	AW-03 18 - 20 11/11/12	AW-03 20 - 22 11/11/12	AW-04 4 - 8 11/12/12	AW-04 22 - 22.5 11/12/12
Semivolatile Organics (Cont.)													
Atrazine	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Benzaldehyde	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Benzo(a)anthracene	mg/kg	1	5.6	0.19 U	0.58 J [3.7 U]	0.11 J	1 U	**9**	0.86	0.078 J	0.2 U	1.4 [3.7]	0.013 J
Benzo(a)pyrene	mg/kg	1	1	0.0094 J	0.69 J [0.71 J]	0.11 J	1 U	**8.8**	1	0.16 J	0.096 J	**1.6 [3.7]**	0.2 U
Benzo(b)fluoranthene	mg/kg	1	5.6	0.014 J	1 J [0.84 J]	0.11 J	0.065 J	**13**	1.3	0.2	0.13 J	1.9 [4.5]	0.12 J
Benzo(g,h,i)perylene	mg/kg	100	500	0.19 U	0.28 J [0.47 J]	0.058 J	1 U	2.8	0.36 J	0.025 J	0.2 U	0.34 J [1.3]	0.2 U
Benzo(k)fluoranthene	mg/kg	3.9	56	0.0088 J	0.38 J [0.36 J]	0.057 J	1 U	4.6	0.57	0.047 J	0.0073 J	1.1 [2.3]	0.0033 J
bis(2-Chloroethoxy)methane	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
bis(2-Chloroethyl)ether	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
bis(2-Ethylhexyl)phthalate	mg/kg	- -	- -	0.43	1.9 U [3.7 U]	0.14 J	1 U	2.7 U	0.65	0.13 J	0.16 J	1 U [0.95 U]	1.4
Butylbenzylphthalate	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Caprolactam	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Carbazole	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	0.69 J	0.098 J	0.17 J	0.097 J	0.11 J [0.62 J]	0.2 U
Chrysene	mg/kg	3.9	56	0.015 J	0.55 J [0.6 J]	0.088 J	1 U	8	0.75	0.072 J	0.014 J	1.4 [3.3]	0.0052 J
Dibenzo(a,h)anthracene	mg/kg	0.33	0.56	0.19 U	1.9 U [3.7 U]	0.028 J	1 U	**0.63 J**	0.23	0.2 U	0.2 U	**0.8 J [0.94 J]**	0.2 U
Dibenzofuran	mg/kg	59	350	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	1.3 J	0.084 J	0.22	0.043 J	0.13 J [0.65 J]	0.008 J
Diethylphthalate	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Dimethylphthalate	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Di-n-Butylphthalate	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Di-n-Octylphthalate	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.15 J	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Fluoranthene	mg/kg	100	500	0.19 U	1.1 J [1.2 J]	0.15 J	1 U	17	1.4	0.15 J	0.021 J	2.6 J [8.1 J]	0.0039 J
Fluorene	mg/kg	100	500	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.3 J	0.13 J	0.19 J	0.027 J	0.27 J [1.1 J]	0.0083 J
Hexachlorobenzene	mg/kg	1.2	6	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Hexachlorobutadiene	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Hexachlorocyclopentadiene	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Hexachloroethane	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.5	5.6	0.19 U	0.26 J [0.4 J]	0.058 J	1 U	2.4 J	0.38	0.14 J	0.2 U	0.89 J [1.6]	0.2 U
Isophorone	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Naphthalene	mg/kg	100	500	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	6.6	0.83	0.067 J	0.042 J	0.16 J [0.36 J]	1.2
Nitrobenzene	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
N-Nitroso-di-n-propylamine	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
N-Nitrosodiphenylamine	mg/kg	- -	- -	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Pentachlorophenol	mg/kg	6.7	6.7	0.36 U	3.7 U [7.2 U]	0.43 U	2 U	5.2 U	0.4 U	0.38 U	0.39 U	2 U [1.8 U]	0.38 U
Phenanthrene	mg/kg	100	500	0.19 U	0.81 J [0.8 J]	0.053 J	1 U	12	0.87	0.22	0.032 J	1.6 J [6.8 J]	0.011 J
Phenol	mg/kg	100	500	0.19 U	1.9 U [3.7 U]	0.22 U	1 U	2.7 U	0.2 U	0.2 U	0.2 U	1 U [0.95 U]	0.2 U
Pyrene	mg/kg	100	500	0.19 U	0.84 J [1 J]	0.15 J	1 U	13 J	1.1	0.1 J	0.019 J	1.9 J [7.1 J]	0.2 U
Total PAHs	mg/kg	- -	- -	0.0472 J	6.877 J [6.38 J]	1.016 J	0.065 J	110.32 J	10.318 J	1.9473 J	0.5193 J	17.056 J [48.25 J]	1.3777 J
Total SVOCs	mg/kg	- -	- -	0.4772 J	6.877 J [6.38 J]	1.156 J	0.065 J	112.63 J	11.328 J	2.4793 J	0.8193 J	17.296 J [49.597 J]	2.8847 J

See Notes on Page 9.

Table 4
Summary of Soil Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Sample Depth(Feet): / Date Collected:	Units	Restricted Use SCOs Residential	Restricted Use SCOs Commercial	AB-C2 22 - 24 08/06/12	AW-01 5 - 7 08/02/12	AW-01 20 - 22.5 08/02/12	AW-02 8 - 10 08/02/12	AW-02 18 - 21 08/02/12	AW-03 4 - 8 11/11/12	AW-03 18 - 20 11/11/12	AW-03 20 - 22 11/11/12	AW-04 4 - 8 11/12/12	AW-04 22 - 22.5 11/12/12
Inorganics													
Aluminum	mg/kg	- -	- -	2,290 J	5,740 J [5,200 J]	9,960 J	11,600 J	8,780 J	10,100	4,190	6,220	6,000 J [10,500 J]	9,160
Antimony	mg/kg	- -	- -	16.8 U	16.9 U [16.4 U]	18.6 U	16.8 U	4.3 J	97 J	16.1 UJ	19.4 UJ	17.2 UJ [16.7 UJ]	18.8 UJ
Arsenic	mg/kg	16	16	2.7	5.5 [4.8]	4.9	4.9	**34**	15.4	2.8	3.2	6.2 [5.4]	4.2
Barium	mg/kg	400	400	23.5 J	48.2 J [47.2 J]	77.2 J	78.6 J	357 J	81 J	48.9 J	64.6 J	55.8 J [143 J]	91 J
Beryllium	mg/kg	72	590	0.13 J	0.4 [0.51]	0.5	0.58	0.59	0.59	0.2 J	0.3	0.47 [1.9]	0.47
Cadmium	mg/kg	4.3	9.3	0.27	0.64 [0.35]	0.22 J	0.24	2.6	0.45	0.25	0.22 J	0.38 [0.4]	0.27
Calcium	mg/kg	- -	- -	106,000 J	75,700 J [75,100 J]	37,900 J	22,900 J	18,600 J	28,900	53,300	61,400	103,000 [90,500 J]	83,900
Chromium	mg/kg	- -	- -	5.1 J	13.1 J [10.7 J]	15.3 J	17.8 J	74.9 J	21	6.7	9.9	8.8 [7.9]	14
Cobalt	mg/kg	- -	- -	2.4	5.8 [4.6]	8.8	11	9.9	5.3	3.7	5.3	4.9 [4.9]	7.5
Copper	mg/kg	270	270	5.6	18.4 [18.7]	16.1	18.4	213	25.6	8.4	11.7	17.8 [19.6]	16.7
Iron	mg/kg	- -	- -	5,740 J	16,000 J [12,700 J]	16,000 J	18,000 J	22,100 J	12,100	8,100	11,200	12,000 [12,600 J]	16,900
Lead	mg/kg	400	1,000	4.7 J	124 J [93 J]	27.2 J	19.3 J	2,640 J	949	9.8	11.3	45.5 [47.1]	15.9
Magnesium	mg/kg	- -	- -	26,300	28,100 [30,700]	11,800	11,900	8,760	10,500	25,100	26,500	38,600 J [17,900 J]	36,300
Manganese	mg/kg	2,000	10,000	187	496 [341]	302	374	297	323	325	386	525 J [950 J]	555
Mercury	mg/kg	0.81	2.8	0.018 J	0.055 [0.074]	0.096	**4.5**	**6.4**	0.092 J	0.024 UJ	0.023 UJ	0.035 J [0.062 J]	0.024 UJ
Nickel	mg/kg	310	310	5.8	14.6 [14.8]	19.9	25.7	46.8	13	7.9	11.3	13.4 [14.9]	16.4
Potassium	mg/kg	- -	- -	724 J	1,000 J [848 J]	1,500 J	1,590 J	1,010 J	1,410 J	1,160 J	1,740 J	1,060 J [1,110 J]	2,550 J
Selenium	mg/kg	180	1,500	4.5 U	4.5 U [1.2 J]	5 U	4.5 U	2.1 J	5.1 U	4.3 U	5.2 U	4.6 U [1.1 J]	5 U
Silver	mg/kg	180	1,500	0.56 U	0.56 U [0.55 U]	0.62 U	0.56 U	4.1	0.64 U	0.54 U	0.65 U	0.57 U [0.56 U]	0.63 U
Sodium	mg/kg	- -	- -	248	359 [305]	451	447	670	487	328	394	252 [423]	288
Thallium	mg/kg	- -	- -	6.7 U	6.8 U [6.5 U]	0.42 J	6.7 U	9.4 U	7.7 U	6.4 U	7.8 U	6.9 U [6.7 U]	7.5 U
Vanadium	mg/kg	- -	- -	7.8 J	17.8 J [11.4 J]	20.7 J	23.1 J	19.6 J	28.5	11.6	16.2	12 [11.1]	19.5
Zinc	mg/kg	10,000	10,000	68.1 J	168 J [84.2 J]	59.7 J	77.4 J	1,730 J	171 J	58.6 J	53.3 J	70.7 J [74.7 J]	60.2 J
Miscellaneous													
Cyanide	mg/kg	27	27	1 U	1.2 [0.63 J]	1.2 U	1.2 U	1.5	0.98 J	0.82 J	0.87 J	3.8 [2.4]	0.81 J
Cyanide, Free	mg/kg	- -	- -	0.69 UB	0.42 J [0.49 U]	0.34 J	1.3	1.7	0.52 J	2.5 U	0.27 J	0.13 J [0.18 J]	0.14 J
Percent Moisture	%	- -	- -	NA	NA	NA	NA	NA	18	15	16	18 [11]	16
Percent Solids	%	- -	- -	NA	NA	NA	NA	NA	82	85	84	82 [89]	84

See Notes on Page 9.

Table 4
Summary of Soil Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Notes:
Restricted Use SCO Residential: NYSDEC 6 NYCRR Part 375 Restricted Use Soil Cleanup Objectives for Protection of Residential Use.
Bold font and shading indicates that the sample result exceeds the NYSDEC 6 NYCRR Part 375 Restricted Use Soil Cleanup Objectives for Protection of Commercial Use.
Results reported in milligrams per kilogram (mg/kg); also expressed as parts per million (ppm).
[ ] Bracketed results represent a duplicate sample.
B: Analyte was also detected in the associated method blank.
J: Indicates an estimated value.
ND: None detected.
U: The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Table 5
Summary of Groundwater Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Standards and Guidance Values	Units	AW-01 08/22/12	AW-01 08/27/13	AW-02 08/22/12	AW-02 08/27/13	AW-03 12/28/12	AW-03 08/27/13	AW-04 12/28/12	AW-04 08/27/13
Volatile Organics										
1,1,1-Trichloroethane	5	ug/L	1 U [1 U]	3.3 U	1 U	3.3 U	5 U [5 U]	3.3 U [3.3 U]	5 U	8.2 U
1,1,2,2-Tetrachloroethane	5	ug/L	1 U [1 U]	0.84 U	1 U	0.84 U	5 U [5 U]	0.84 U [0.84 U]	5 U	2.1 U
1,1,2-trichloro-1,2,2-trifluoroethane	5	ug/L	1 U [1 U]	1.2 U	1 U	1.2 U	5 U [5 U]	1.2 U [1.2 U]	5 U	3.1 U
1,1,2-Trichloroethane	1	ug/L	1 U [1 U]	0.92 U	1 U	0.92 U	5 U [5 U]	0.92 U [0.92 U]	5 U	2.3 U
1,1-Dichloroethane	5	ug/L	1 U [1 U]	1.5 U	1 U	1.5 U	5 U [5 U]	1.5 U [1.5 U]	5 U	3.8 U
1,1-Dichloroethene	5	ug/L	1 U [1 U]	1.2 U	1 U	1.2 U	5 U [5 U]	1.2 U [1.2 U]	5 U	2.9 U
1,2,4-Trichlorobenzene	5	ug/L	1 U [1 U]	1.6 U	1 U	1.6 U	5 U [5 U]	1.6 U [1.6 U]	5 U	4.1 U
1,2-Dibromo-3-chloropropane	0.04	ug/L	1 U [1 U]	1.6 UJ	1 U	1.6 UJ	5 U [5 U]	1.6 UJ [1.6 UJ]	5 U	3.9 UJ
1,2-Dibromoethane	0.0006	ug/L	1 U [1 U]	2.9 U	1 U	2.9 U	5 U [5 U]	2.9 U [2.9 U]	5 U	7.3 U
1,2-Dichlorobenzene	3	ug/L	1 U [1 U]	3.2 U	1 U	3.2 U	5 U [5 U]	3.2 U [3.2 U]	5 U	7.9 U
1,2-Dichloroethane	0.6	ug/L	1 U [1 U]	0.84 U	1 U	0.84 U	5 U [5 U]	0.84 U [0.84 U]	5 U	2.1 U
1,2-Dichloropropane	1	ug/L	1 U [1 U]	2.9 U	1 U	2.9 U	5 U [5 U]	2.9 U [2.9 U]	5 U	7.2 U
1,3-Dichlorobenzene	3	ug/L	1 U [1 U]	3.1 U	1 U	3.1 U	5 U [5 U]	3.1 U [3.1 U]	5 U	7.8 U
1,4-Dichlorobenzene	3	ug/L	1 U [1 U]	3.4 U	1 U	3.4 U	5 U [5 U]	3.4 U [3.4 U]	5 U	8.4 U
2-Butanone	50	ug/L	10 U [10 U]	5.3 U	10 U	5.3 U	50 U [50 U]	5.3 U [5.3 U]	50 U	13 U
2-Hexanone	50	ug/L	5 U [5 U]	5 U	5 U	5 U	25 U [25 U]	5 U [5 U]	25 U	12 U
4-Methyl-2-pentanone	- -	ug/L	5 U [5 U]	8.4 U	5 U	8.4 U	25 U [25 U]	8.4 U [8.4 U]	25 U	21 U
Acetone	50	ug/L	10 U [10 U]	12 U	10 U	12 U	50 U [50 U]	12 U [12 U]	50 U	30 U
Benzene	1	ug/L	**0.58 J [0.55 J]**	1.6 U	1 U	1.6 U	**12 [12]**	**4.8 [4.9]**	**170**	**310**
Bromodichloromethane	50	ug/L	1 U [1 U]	1.6 UJ	1 U	1.6 U	5 U [5 U]	1.6 U [1.6 U]	5 U	3.9 U
Bromoform	50	ug/L	1 U [1 U]	1 UJ	1 U	1 UJ	5 U [5 U]	1 UJ [1 UJ]	5 U	2.6 UJ
Bromomethane	5	ug/L	1 U [1 UJ]	2.8 UJ	1 U	2.8 U	5 U [5 U]	2.8 U [2.8 U]	5 U	6.9 U
Carbon Disulfide	60	ug/L	1 U [1 U]	0.76 UJ	1 U	0.76 UJ	5 U [5 U]	0.76 UJ [0.76 UJ]	5 U	1.9 UJ
Carbon Tetrachloride	5	ug/L	1 U [1 U]	1.1 U	1 U	1.1 U	5 U [5 U]	1.1 U [1.1 U]	5 U	2.7 U
Chlorobenzene	5	ug/L	1 U [1 U]	3 U	1 U	3 U	5 U [5 U]	3 U [3 U]	5 U	7.5 U
Chloroethane	5	ug/L	1 U [1 U]	1.3 UJ	1 U	1.3 U	5 U [5 U]	1.3 U [1.3 U]	5 U	3.2 U
Chloroform	7	ug/L	1 U [1 U]	1.4 U	1 U	1.4 U	5 U [5 U]	1.4 U [1.4 U]	5 U	3.4 U
Chloromethane	5	ug/L	1 U [1 U]	1.4 UJ	1 U	1.4 U	5 U [5 U]	1.4 U [1.4 U]	5 U	3.5 U
cis-1,2-Dichloroethene	5	ug/L	1 U [1 U]	3.2 U	1 U	3.2 U	5 U [5 U]	3.2 U [3.2 U]	5 U	8.1 U
cis-1,3-Dichloropropene	0.4	ug/L	1 U [1 U]	1.4 U	1 U	1.4 U	5 U [5 U]	1.4 U [1.4 U]	5 U	3.6 U
Cyclohexane	- -	ug/L	1 U [1 U]	0.72 UJ	1 U	0.72 UJ	5 U [5 U]	0.72 UJ [0.72 UJ]	5 U	1.8 UJ
Dibromochloromethane	50	ug/L	1 U [1 U]	1.3 UJ	1 U	1.3 U	5 U [5 U]	1.3 U [1.3 U]	5 U	3.2 U
Dichlorodifluoromethane	5	ug/L	1 U [1 U]	2.7 U	1 U	2.7 U	5 U [5 U]	2.7 U [2.7 U]	5 U	6.8 U
Ethylbenzene	5	ug/L	1 U [1 U]	3 U	1 U	3 U	5 U [5 U]	3 U [3 U]	**4 J**	**36**
Isopropylbenzene	5	ug/L	1 U [1 U]	3.2 U	1 U	3.2 U	5 U [5 U]	3.2 U [3.2 U]	5 U	7.9 U
Methyl acetate	- -	ug/L	1 U [1 U]	2 U	1 U	2 U	5 U [5 U]	2 U [2 U]	5 U	5 U
Methyl tert-butyl ether	10	ug/L	1 U [1 U]	0.64 U	1 U	0.64 U	5 U [5 U]	0.64 U [0.64 U]	5 U	1.6 U
Methylcyclohexane	- -	ug/L	1 U [1 U]	0.64 U	1 U	0.64 U	5 U [5 U]	0.64 U [0.64 U]	5 U	1.6 U
Methylene Chloride	5	ug/L	1 U [1 U]	1.8 U	1 U	1.8 U	**4.3 J [3 J]**	1.8 U [1.8 U]	5 U	4.4 U
Styrene	5	ug/L	1 U [1 U]	2.9 U	1 U	2.9 U	5 U [5 U]	2.9 U [2.9 U]	5 U	7.3 U

See Notes on Page 4.

Table 5
Summary of Groundwater Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Standards and Guidance Values	Units	AW-01 08/22/12	AW-01 08/27/13	AW-02 08/22/12	AW-02 08/27/13	AW-03 12/28/12	AW-03 08/27/13	AW-04 12/28/12	AW-04 08/27/13
Volatile Organics (Cont.)										
Tetrachloroethene	5	ug/L	1 U [1 U]	1.4 U	1 U	1.4 U	5 U [5 U]	1.4 U [1.4 U]	5 U	3.6 U
Toluene	5	ug/L	1 U [1 U]	2 U	1 U	2 U	5 U [5 U]	2 U [2 U]	5 U	5.1 U
trans-1,2-Dichloroethene	5	ug/L	1 U [1 U]	3.6 U	1 U	3.6 U	5 U [5 U]	3.6 U [3.6 U]	5 U	9 U
trans-1,3-Dichloropropene	0.4	ug/L	1 U [1 U]	1.5 U	1 U	1.5 U	5 U [5 U]	1.5 U [1.5 U]	5 U	3.7 U
Trichloroethene	5	ug/L	1 U [1 U]	1.8 U	1 U	1.8 U	5 U [5 U]	1.8 U [1.8 U]	5 U	4.6 U
Trichlorofluoromethane	5	ug/L	1 U [1 U]	3.5 U	1 U	3.5 U	5 U [5 U]	3.5 U [3.5 U]	5 U	8.8 U
Vinyl Chloride	2	ug/L	1 U [1 U]	3.6 U	1 U	3.6 U	5 U [5 U]	3.6 U [3.6 U]	5 U	9 U
Xylenes (total)	5	ug/L	2 U [2 U]	2.6 U	2 U	2.6 U	10 U [10 U]	2.6 U [2.6 U]	10 U	**8.9 J**
Total BTEX	- -	ug/L	**0.58 J [0.55 J]**	ND	ND	ND	**12 [12]**	**4.8 [4.9]**	**174 J**	**354.9 J**
Total VOCs	- -	ug/L	**0.58 J [0.55 J]**	ND	ND	ND	**16.3 J [15 J]**	**4.8 [4.9]**	**174 J**	**354.9 J**
Semivolatile Organics										
1,1'-Biphenyl	5	ug/L	4.7 U [4.7 U]	0.62 U	4.8 U	0.6 U	**4.5 J [4.4 J]**	**1.2 J [1.1 J]**	4.7 U	0.62 U
2,2'-Oxybis(1-Chloropropane)	5	ug/L	4.7 U [4.7 U]	0.49 U	4.8 U	0.48 U	5 U [5 U]	0.49 U [0.5 U]	4.7 U	0.49 U
2,4,5-Trichlorophenol	- -	ug/L	4.7 U [4.7 U]	0.45 U	4.8 U	0.44 U	5 U [5 U]	0.45 U [0.46 U]	4.7 U	0.45 U
2,4,6-Trichlorophenol	- -	ug/L	4.7 U [4.7 U]	0.58 U	4.8 U	0.57 U	5 U [5 U]	0.57 U [0.59 U]	4.7 U	0.58 U
2,4-Dichlorophenol	5	ug/L	4.7 U [4.7 U]	0.48 U	4.8 U	0.47 U	5 U [5 U]	0.48 U [0.49 U]	4.7 U	0.48 U
2,4-Dimethylphenol	50	ug/L	4.7 U [4.7 U]	0.47 U	4.8 U	0.46 U	5 U [5 U]	0.47 U [0.48 U]	**11 J**	**14**
2,4-Dinitrophenol	10	ug/L	9.4 U [9.4 U]	2.1 U	9.6 U	2.1 U	9.9 U [9.9 U]	2.1 U [2.1 U]	9.5 U	2.1 U
2,4-Dinitrotoluene	5	ug/L	4.7 U [4.7 U]	0.42 U	4.8 U	0.41 U	5 U [5 U]	0.42 U [0.43 U]	4.7 U	0.42 U
2,6-Dinitrotoluene	5	ug/L	4.7 U [4.7 U]	0.38 UJ	4.8 U	0.37 UJ	5 U [5 U]	0.38 UJ [0.39 UJ]	4.7 U	0.38 UJ
2-Chloronaphthalene	10	ug/L	4.7 U [4.7 U]	0.43 U	4.8 U	0.43 U	5 U [5 U]	0.43 U [0.44 U]	4.7 U	0.43 U
2-Chlorophenol	- -	ug/L	4.7 U [4.7 U]	0.5 U	4.8 U	0.49 U	5 U [5 U]	0.5 U [0.51 U]	4.7 U	0.5 U
2-Methylnaphthalene	- -	ug/L	4.7 U [4.7 U]	0.57 U	4.8 U	0.56 U	**39 [41]**	0.56 U [0.58 U]	**1.6 J**	0.57 U
2-Methylphenol	- -	ug/L	4.7 U [4.7 U]	0.38 U	4.8 U	0.37 U	5 U [5 U]	0.38 U [0.39 U]	4.7 UJ	0.38 U
2-Nitroaniline	5	ug/L	9.4 U [9.4 U]	0.4 U	9.6 U	0.39 U	9.9 U [9.9 U]	0.4 U [0.41 U]	9.5 U	0.4 U
2-Nitrophenol	- -	ug/L	4.7 U [4.7 U]	0.45 U	4.8 U	0.44 U	5 U [5 U]	0.45 U [0.46 U]	4.7 U	0.45 U
3,3'-Dichlorobenzidine	5	ug/L	4.7 U [4.7 U]	0.38 U	4.8 U	0.37 U	5 U [5 U]	0.38 U [0.39 U]	4.7 U	0.38 U
3-Nitroaniline	5	ug/L	9.4 U [9.4 U]	0.45 UJ	9.6 U	0.44 UJ	9.9 U [9.9 U]	0.45 UJ [0.46 UJ]	9.5 U	0.45 UJ
4,6-Dinitro-2-methylphenol	- -	ug/L	9.4 U [9.4 U]	2.1 U	9.6 U	2 U	9.9 U [9.9 U]	2.1 U [2.1 U]	9.5 U	2.1 U
4-Bromophenyl-phenylether	- -	ug/L	4.7 U [4.7 U]	0.43 UJ	4.8 U	0.42 UJ	5 U [5 U]	0.42 UJ [0.44 UJ]	4.7 U	0.43 UJ
4-Chloro-3-Methylphenol	- -	ug/L	4.7 U [4.7 U]	0.43 U	4.8 U	0.42 U	5 U [5 U]	0.42 U [0.44 U]	4.7 U	0.43 U
4-Chloroaniline	5	ug/L	4.7 U [4.7 U]	0.56 UJ	4.8 U	0.55 UJ	5 U [5 U]	0.55 UJ [0.57 UJ]	4.7 U	0.56 UJ
4-Chlorophenyl-phenylether	- -	ug/L	4.7 U [4.7 U]	0.33 U	4.8 U	0.32 U	5 U [5 U]	0.33 U [0.34 U]	4.7 U	0.33 U
4-Methylphenol	- -	ug/L	9.4 U [9.4 U]	0.34 U	9.6 U	0.33 U	9.9 U [9.9 U]	0.34 U [0.35 U]	9.5 U	0.34 U
4-Nitroaniline	5	ug/L	9.4 U [9.4 U]	0.24 UJ	9.6 U	0.23 UJ	9.9 U [9.9 U]	0.24 UJ [0.24 UJ]	9.5 U	0.24 UJ
4-Nitrophenol	- -	ug/L	9.4 U [9.4 U]	1.4 U	9.6 U	1.4 U	9.9 U [9.9 U]	1.4 U [1.5 U]	9.5 U	1.4 U
Acenaphthene	20	ug/L	**2.2 J [2 J]**	**2.7 J**	**1.1 J**	**3.3 J**	**81 [80]**	**43 [41]**	**1.9 J**	**1.8 J**
Acenaphthylene	- -	ug/L	4.7 U [4.7 U]	0.36 U	4.8 U	0.35 U	**0.78 J [0.75 J]**	**0.39 J [0.4 J]**	4.7 U	0.36 U
Acetophenone	- -	ug/L	4.7 U [4.7 U]	0.51 U	4.8 U	0.5 U	**5 U [0.96 J]**	4.7 UB [0.52 U]	4.7 U	4.7 UB
Anthracene	50	ug/L	4.7 U [4.7 U]	0.26 U	4.8 U	**0.32 J**	**7.9 [8.3]**	**5.4 [5]**	4.7 U	0.26 U

See Notes on Page 4.

Table 5
Summary of Groundwater Sample Analytical Results

Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Standards and Guidance Values	Units	AW-01 08/22/12	AW-01 08/27/13	AW-02 08/22/12	AW-02 08/27/13	AW-03 12/28/12	AW-03 08/27/13	AW-04 12/28/12	AW-04 08/27/13
Semivolatile Organics (Cont.)										
Atrazine	7.5	ug/L	4.7 U [4.7 U]	0.43 U	4.8 U	0.43 U	5 U [5 U]	0.43 U [0.44 U]	4.7 U	0.43 U
Benzaldehyde	- -	ug/L	4.7 U [4.7 U]	**0.43 J**	4.8 U	**0.31 J**	5 U [5 U]	**0.44 J [0.41 J]**	4.7 U	**0.42 J**
Benzo(a)anthracene	0.002	ug/L	4.7 U [4.7 U]	0.34 U	4.8 U	0.33 U	5 U [5 U]	**0.35 J [0.36 J]**	4.7 U	0.34 U
Benzo(a)pyrene	- -	ug/L	4.7 U [4.7 U]	0.44 U	4.8 U	0.44 U	5 U [5 U]	0.44 U [0.45 U]	4.7 U	0.44 U
Benzo(b)fluoranthene	0.002	ug/L	4.7 U [4.7 U]	0.32 U	4.8 U	0.31 U	5 U [5 U]	0.32 U [0.33 U]	4.7 U	0.32 U
Benzo(g,h,i)perylene	- -	ug/L	4.7 U [4.7 U]	0.33 UJ	4.8 U	0.32 U	5 U [5 U]	0.33 U [0.34 U]	4.7 U	0.33 U
Benzo(k)fluoranthene	0.002	ug/L	4.7 U [4.7 U]	0.69 U	4.8 U	0.68 U	5 U [5 U]	0.69 U [0.71 U]	4.7 U	0.69 U
bis(2-Chloroethoxy)methane	5	ug/L	4.7 U [4.7 U]	0.33 U	4.8 U	0.32 U	5 U [5 U]	0.33 U [0.34 U]	4.7 U	0.33 U
bis(2-Chloroethyl)ether	- -	ug/L	4.7 U [4.7 U]	0.38 U	4.8 U	0.37 U	5 U [5 U]	0.38 U [0.39 U]	4.7 U	0.38 U
bis(2-Ethylhexyl)phthalate	5	ug/L	4.7 U [4.7 U]	1.7 U	4.8 U	1.7 U	5 U [5 U]	4.7 UB [1.7 U]	4.7 U	1.7 U
Butylbenzylphthalate	50	ug/L	4.7 U [4.7 U]	0.4 U	4.8 U	0.39 U	5 U [5 U]	0.4 U [0.41 U]	4.7 U	0.4 U
Caprolactam	- -	ug/L	4.7 U [4.7 U]	2.1 U	4.8 U	2 U	5 UJ [5 UJ]	2.1 U [2.1 U]	4.7 UJ	2.1 U
Carbazole	- -	ug/L	4.7 U [4.7 U]	0.28 U	4.8 U	**0.71 J**	**10 [11]**	**4.7 [4.8]**	4.7 U	0.28 U
Chrysene	0.002	ug/L	4.7 U [4.7 U]	0.31 U	4.8 U	0.31 U	5 U [5 U]	0.31 U [0.32 U]	4.7 U	0.31 U
Dibenzo(a,h)anthracene	- -	ug/L	4.7 U [4.7 U]	0.4 UJ	4.8 U	0.39 U	5 U [5 U]	0.4 U [0.41 U]	4.7 U	0.4 U
Dibenzofuran	- -	ug/L	9.4 U [9.4 U]	0.48 U	9.6 U	**0.79 J**	**41 [40]**	**17 [16]**	9.5 U	0.48 U
Diethylphthalate	50	ug/L	4.7 U [4.7 U]	0.21 U	4.8 U	0.2 U	5 U [5 U]	0.21 U [0.21 U]	4.7 U	0.21 U
Dimethylphthalate	50	ug/L	4.7 U [4.7 U]	0.34 U	4.8 U	0.33 U	5 U [5 U]	0.34 U [0.35 U]	4.7 U	0.34 U
Di-n-Butylphthalate	50	ug/L	4.7 U [4.7 U]	**0.4 J**	4.8 U	**0.48 J**	5 U [5 U]	**0.51 J [0.66 J]**	4.7 U	**0.57 J**
Di-n-Octylphthalate	50	ug/L	**1.9 J [4.7 U]**	0.44 U	4.8 U	0.44 U	5 U [5 U]	0.44 U [0.45 U]	4.7 U	0.44 U
Fluoranthene	50	ug/L	4.7 U [4.7 U]	0.38 U	4.8 U	**1.6 J**	**6.7 [6.6]**	**6.2 [5.9]**	4.7 U	0.38 U
Fluorene	50	ug/L	4.7 U [4.7 U]	0.34 U	4.8 U	**0.9 J**	**47 [45]**	**23 [23]**	4.7 U	0.34 U
Hexachlorobenzene	0.04	ug/L	4.7 U [4.7 U]	0.48 U	4.8 U	0.47 U	5 U [5 U]	0.48 U [0.49 U]	4.7 U	0.48 U
Hexachlorobutadiene	0.5	ug/L	4.7 U [4.7 U]	0.64 U	4.8 U	0.63 U	5 U [5 U]	0.64 U [0.66 U]	4.7 U	0.64 U
Hexachlorocyclopentadiene	5	ug/L	4.7 U [4.7 U]	0.56 U	4.8 U	0.55 U	5 U [5 U]	0.55 U [0.57 U]	4.7 U	0.56 U
Hexachloroethane	5	ug/L	4.7 U [4.7 U]	0.56 U	4.8 U	0.55 U	5 U [5 U]	0.55 U [0.57 U]	4.7 U	0.56 U
Indeno(1,2,3-cd)pyrene	0.002	ug/L	4.7 U [4.7 U]	0.44 UJ	4.8 U	0.44 U	5 U [5 U]	0.44 U [0.45 U]	4.7 U	0.44 U
Isophorone	50	ug/L	4.7 U [4.7 U]	0.41 U	4.8 U	0.4 U	5 U [5 U]	0.4 U [0.42 U]	4.7 U	0.41 U
Naphthalene	10	ug/L	4.7 U [4.7 U]	0.72 U	**1.4 J**	0.7 U	**4.9 J [4.6 J]**	0.71 U [0.73 U]	**3.6 J**	**12**
Nitrobenzene	0.4	ug/L	4.7 U [4.7 U]	0.27 U	4.8 U	0.27 U	5 U [5 U]	0.27 U [0.28 U]	4.7 U	0.27 U
N-Nitroso-di-n-propylamine	- -	ug/L	4.7 U [4.7 U]	0.51 U	4.8 U	0.5 U	5 U [5 U]	0.51 U [0.52 U]	4.7 U	0.51 U
N-Nitrosodiphenylamine	50	ug/L	4.7 U [4.7 U]	0.48 U	4.8 U	0.47 U	5 U [5 U]	0.48 U [0.49 U]	4.7 U	0.48 U
Pentachlorophenol	1	ug/L	9.4 U [9.4 U]	2.1 U	9.6 U	2 U	9.9 U [9.9 U]	2.1 U [2.1 U]	9.5 U	2.1 U
Phenanthrene	50	ug/L	4.7 U [4.7 U]	4.7 UB	4.8 U	4.6 UB	**45 [46]**	**23 [23]**	4.7 U	0.42 U
Phenol	1	ug/L	4.7 U [4.7 U]	0.37 U	4.8 U	0.36 U	5 U [5 U]	0.37 U [0.38 U]	4.7 U	**4.1 J**
Pyrene	50	ug/L	4.7 U [4.7 U]	0.32 U	**0.59 J**	**0.74 J**	**3.7 J [3.6 J]**	**2.4 J [2.6 J]**	4.7 U	0.32 U
Total PAHs	- -	ug/L	**2.2 J [2 J]**	**2.7 J**	**3.09 J**	**6.86 J**	**235.98 J [235.85 J]**	**103.74 J [101.26 J]**	**7.1 J**	**17.9 J**
Total SVOCs	- -	ug/L	**4.1 J [6.7 J]**	**3.53 J**	**3.09 J**	**9.15 J**	**291.48 J [292.21 J]**	**127.59 J [124.23 J]**	**18.1 J**	**32.89 J**

See Notes on Page 4.

Table 5
Summary of Groundwater Sample Analytical Results

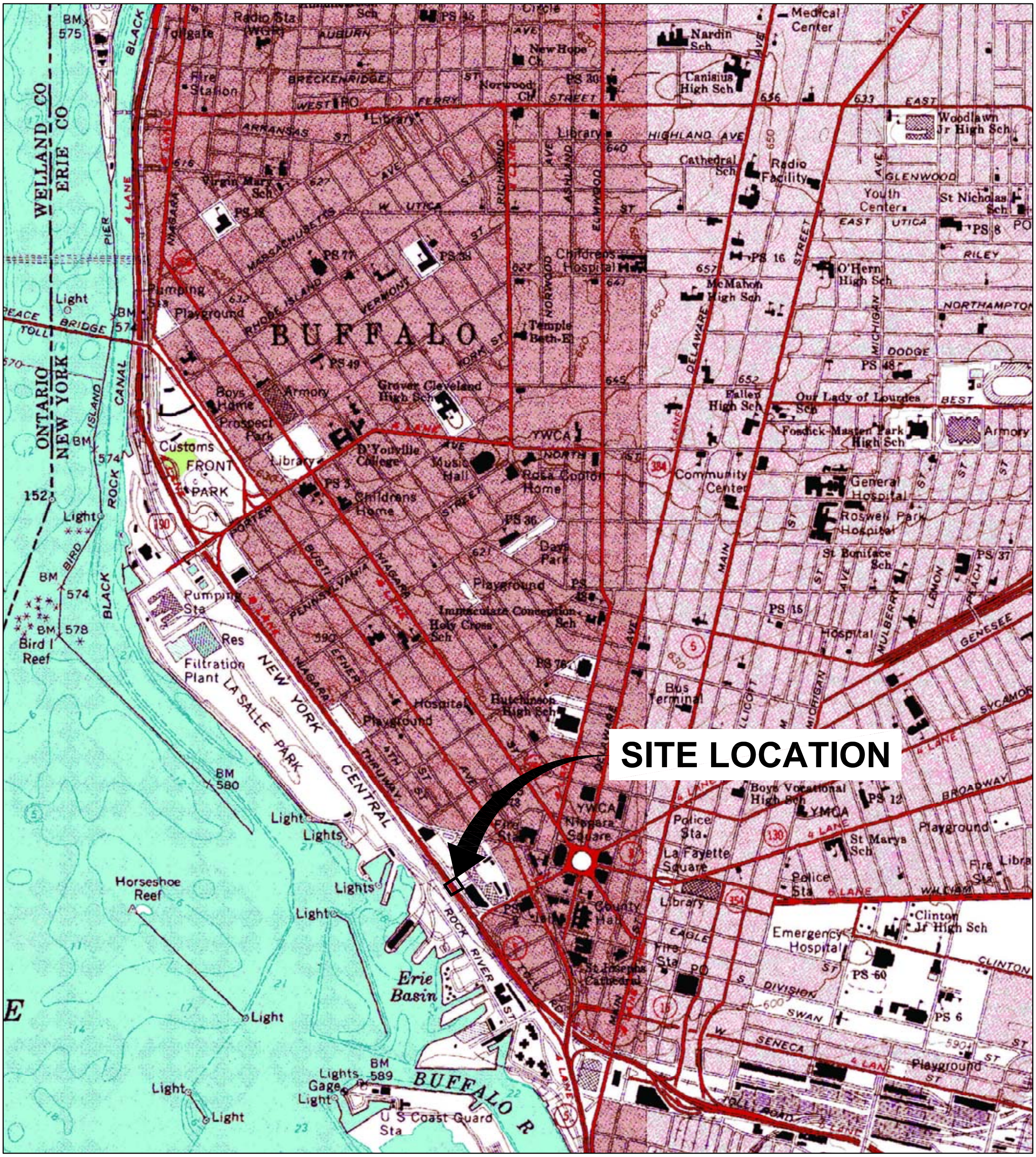
Site Characterization
National Fuel Gas Distribution Corporation
Former Buffalo Service Station - Off-Site
Buffalo, NY

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Standards and Guidance Values	Units	AW-01 08/22/12	AW-01 08/27/13	AW-02 08/22/12	AW-02 08/27/13	AW-03 12/28/12	AW-03 08/27/13	AW-04 12/28/12	AW-04 08/27/13
Inorganics										
Aluminum	- -	mg/L	**0.071 J [0.086 J]**	0.06 U	**0.3**	**0.11 J**	0.2 U [0.2 U]	0.06 U [0.06 U]	**2.2**	**0.064 J**
Antimony	0.003	mg/L	0.02 U [0.02 U]	0.0068 U	0.02 U	0.0068 U	0.02 U [0.02 U]	0.0068 U [0.0068 U]	0.02 U	0.0068 U
Arsenic	0.025	mg/L	0.01 U [0.01 U]	0.0056 U	0.01 U	0.0056 U	**0.0085 J [0.0058 J]**	**0.0076 J [0.0056 U]**	0.01 U	0.0056 U
Barium	1	mg/L	**0.052 [0.052]**	**0.051**	**1.8**	**0.53**	**0.094 [0.094]**	**0.063 [0.063]**	**1.1**	**0.7**
Beryllium	0.003	mg/L	0.002 U [0.002 U]	0.0003 U	0.002 U	0.0003 U	0.002 U [0.002 U]	0.0003 U [0.0003 U]	0.002 U	0.0003 U
Cadmium	0.005	mg/L	**0.001 U [0.00053 J]**	0.0005 U	0.001 U	0.0005 U	0.001 U [0.001 U]	0.0005 U [0.0005 U]	0.001 U	0.0005 U
Calcium	- -	mg/L	**294 [301]**	**344**	**376**	**183**	**373 [372]**	**245 [243]**	**453**	**374**
Chromium	0.05	mg/L	0.004 U [0.004 U]	**0.0018 J**	**0.0019 J**	**0.0015 J**	**0.0025 J [0.0028 J]**	**0.0021 J [0.0022 J]**	**0.0046**	**0.0023 J**
Cobalt	- -	mg/L	**0.004 U [0.00071 J]**	**0.00071 J**	**0.0039 J**	0.00063 U	**0.00068 J [0.004 U]**	0.00063 U [0.00063 U]	**0.00094 J**	0.00063 U
Copper	0.2	mg/L	**0.01 U [0.0022 J]**	**0.002 J**	**0.0031 J**	**0.002 J**	**0.0024 J [0.01 U]**	**0.0016 U [0.0017 J]**	**0.0037 J**	**0.0024 J**
Iron	0.3	mg/L	**15.1 [15.3]**	**11.9**	**7.6**	0.32 UB	**15.5 [15.4]**	**16.3 [16.1]**	**15.9**	**14.1**
Lead	0.025	mg/L	0.005 U [0.005 U]	0.003 U	**0.0095**	0.003 U	0.005 U [0.005 U]	0.003 U [0.003 U]	0.005 U	0.003 U
Magnesium	35	mg/L	**19.6 [19.7]**	**19.9**	**68.2**	**32**	**23 [22.8]**	**13.8 [13.6]**	**83.2**	**64.4**
Manganese	0.3	mg/L	**0.77 [0.78]**	**0.8**	**0.71**	**0.38**	**1.4 [1.4]**	**0.76 [0.75]**	**0.83**	**0.75**
Mercury	0.0007	mg/L	0.0002 U [0.0002 U]	0.00012 U	0.0002 U	0.00012 U	0.0002 U [0.0002 U]	0.00012 U [0.00012 U]	0.0002 U	0.00012 U
Nickel	0.1	mg/L	0.01 U [0.01 U]	0.0013 U	0.01 U	0.0013 U	0.01 U [0.01 U]	0.0013 U [0.0013 U]	**0.0026 J**	0.0013 U
Potassium	- -	mg/L	**9.7 [9.7]**	**11.4**	**19.5**	**16.3**	**11.4 [11.2]**	**10.1 [10]**	**49.8**	**46.8**
Selenium	0.01	mg/L	0.015 U [0.015 U]	0.0087 U	0.015 U	0.0087 U	0.015 U [0.015 U]	0.0087 U [0.0087 U]	0.015 U	0.0087 U
Silver	0.05	mg/L	0.003 U [0.003 U]	0.0017 U	0.003 U	0.0017 U	0.003 U [0.003 U]	0.0017 U [0.0017 U]	0.003 U	0.0017 U
Sodium	20	mg/L	**498 [504]**	**521**	**8,090**	**764**	**352 [351]**	**341 [337]**	**649**	**631**
Thallium	0.0005	mg/L	0.02 U [0.02 U]	0.01 U	0.02 U	0.01 U	0.02 U [0.02 U]	0.01 U [0.01 U]	0.02 U	0.01 U
Vanadium	- -	mg/L	**0.0041 J [0.0047 J]**	**0.0025 J**	**0.0042 J**	0.0015 U	**0.0036 J [0.0037 J]**	**0.0029 J [0.0028 J]**	**0.0091**	**0.0057**
Zinc	2	mg/L	**0.0034 J [0.0026 J]**	0.0015 U	**0.014**	0.01 UB	**0.0024 J [0.0024 J]**	0.01 UB [0.01 UB]	**0.011**	0.01 UB
Miscellaneous										
Cyanide	0.2	mg/L	**0.088 J [0.063 J]**	**0.087**	0.02 UBJ	0.005 U	**0.11 [0.093 J]**	**0.11 [0.1]**	**0.011 J**	**0.064**
Cyanide, Free	- -	mg/L	0.002 UB [0.002 UB]	NA	0.002 U	NA	**0.005 U [0.0016 J]**	NA	0.005 U	NA

Notes:
NYSDEC TOGS 1.1.1 Water Standards and Guidance Value exceedances are shaded.
ug/L - micrograms per liter; mg/L = milligrams per liter.
Bolded values are detected.
[ ] Bracketed results represent a duplicate sample.
B: Analyte was also detected in the associated method blank.
J: Indicates an estimated value.
ND: None detected.
U: The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
NA: Not Available/Not Applicable.

ARCADIS

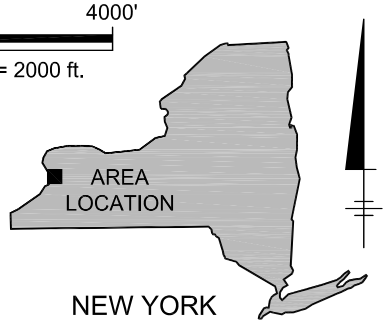
Figures



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUADS., BUFFALO NW, NY-ON, AND BUFFALO NE, 1965.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.



FORMER BUFFALO SERVICE STATION - OFF-SITE
BUFFALO, NEW YORK
SITE CHARACTERIZATION

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY:SYRACUSE, NY DIV/GROUP:ENV/IM-DV DB:D. HOWES, R. ALLEN LD:(Opt) PIC:(Opt) PM:S. POWLIN TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* G:\ENVCAD\SYRACUSE\ACT\B0023310\0000\00003\DWG\SITE-CHAR\23310N01.dwg LAYOUT: 1 SAVED: 12/17/2015 9:05 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/17/2015 9:06 AM BY: ALLEN, ROYCE

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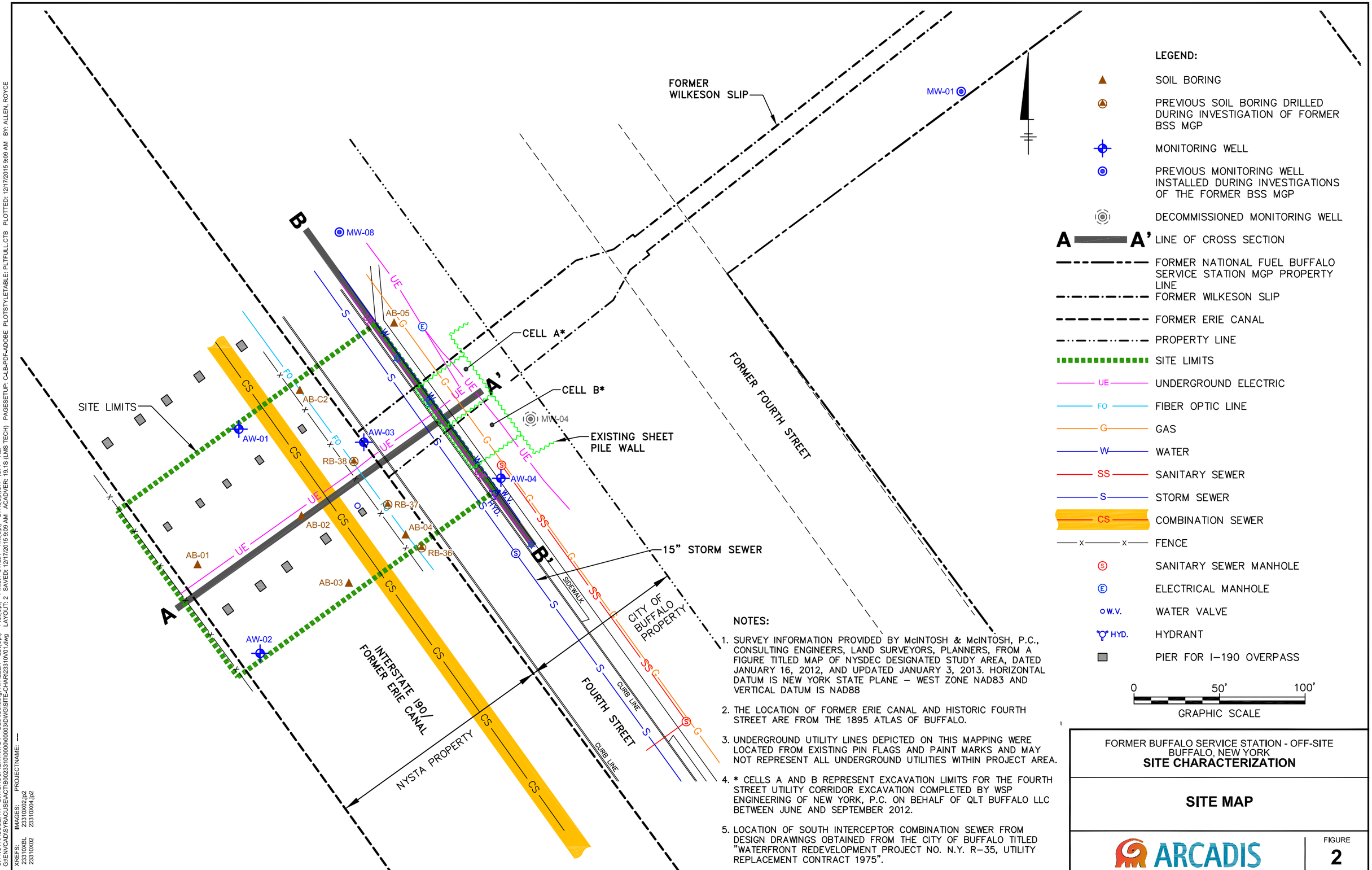

LEGEND:

- SOIL BORING
- PREVIOUS SOIL BORING DRILLED DURING INVESTIGATION OF FORMER BSS MGP
- MONITORING WELL
- PREVIOUS MONITORING WELL INSTALLED DURING INVESTIGATIONS OF THE FORMER BSS MGP
- DECOMMISSIONED MONITORING WELL
- A — A' LINE OF CROSS SECTION
- FORMER NATIONAL FUEL BUFFALO SERVICE STATION MGP PROPERTY LINE
- FORMER WILKESON SLIP
- FORMER ERIE CANAL
- PROPERTY LINE
- SITE LIMITS
- UE — UNDERGROUND ELECTRIC
- FO — FIBER OPTIC LINE
- G — GAS
- W — WATER
- SS — SANITARY SEWER
- S — STORM SEWER
- CS — COMBINATION SEWER
- x — x — FENCE
- Ⓢ SANITARY SEWER MANHOLE
- Ⓔ ELECTRICAL MANHOLE
- O W.V. WATER VALVE
- HYD. HYDRANT
- PIER FOR I-190 OVERPASS

0 50' 100'

GRAPHIC SCALE

NOTES:

1. SURVEY INFORMATION PROVIDED BY McINTOSH & McINTOSH, P.C., CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, FROM A FIGURE TITLED MAP OF NYSDEC DESIGNATED STUDY AREA, DATED JANUARY 16, 2012, AND UPDATED JANUARY 3, 2013. HORIZONTAL DATUM IS NEW YORK STATE PLANE – WEST ZONE NAD83 AND VERTICAL DATUM IS NAD88
2. THE LOCATION OF FORMER ERIE CANAL AND HISTORIC FOURTH STREET ARE FROM THE 1895 ATLAS OF BUFFALO.
3. UNDERGROUND UTILITY LINES DEPICTED ON THIS MAPPING WERE LOCATED FROM EXISTING PIN FLAGS AND PAINT MARKS AND MAY NOT REPRESENT ALL UNDERGROUND UTILITIES WITHIN PROJECT AREA.
4. * CELLS A AND B REPRESENT EXCAVATION LIMITS FOR THE FOURTH STREET UTILITY CORRIDOR EXCAVATION COMPLETED BY WSP ENGINEERING OF NEW YORK, P.C. ON BEHALF OF QLT BUFFALO LLC BETWEEN JUNE AND SEPTEMBER 2012.
5. LOCATION OF SOUTH INTERCEPTOR COMBINATION SEWER FROM DESIGN DRAWINGS OBTAINED FROM THE CITY OF BUFFALO TITLED "WATERFRONT REDEVELOPMENT PROJECT NO. N.Y. R-35, UTILITY REPLACEMENT CONTRACT 1975".

FORMER BUFFALO SERVICE STATION - OFF-SITE
BUFFALO, NEW YORK
SITE CHARACTERIZATION

SITE MAP

ARCADIS

FIGURE **2**

CITY:SYRACUSE, NY DIV/GROUP:ENV/IM-DV DB&A:Schilling, R. ALLEN LD:(Opt) PIC:(Opt) PM:S. POWLIN TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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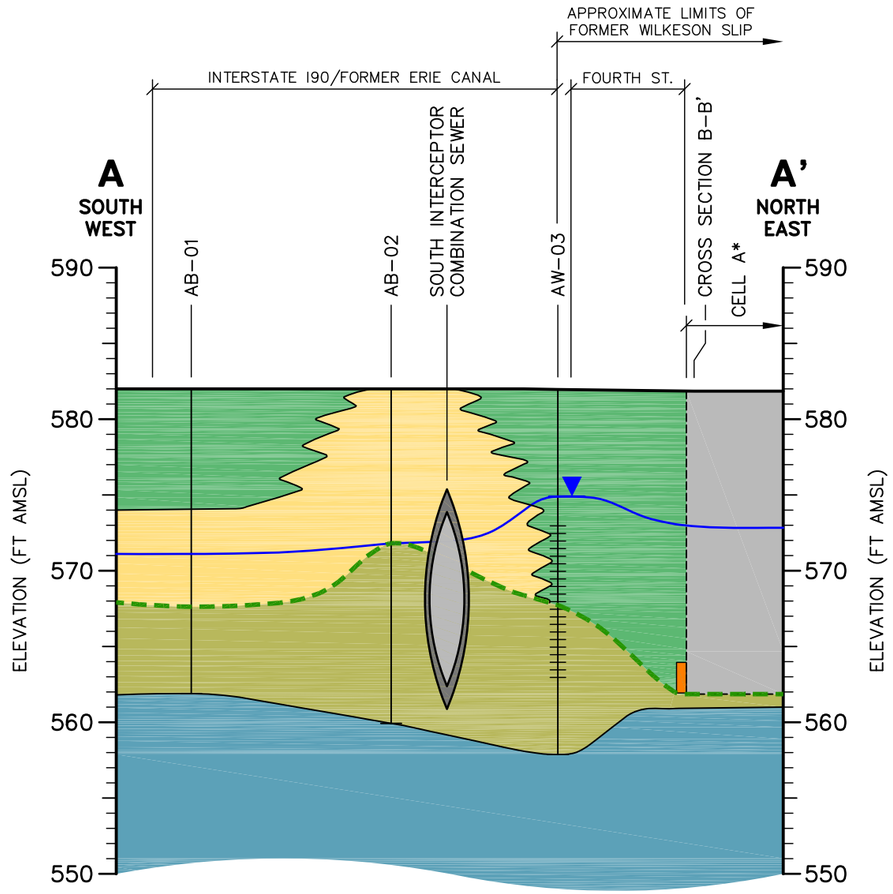

LEGEND:

- WELL OR BORING ID (AB-01)
- GROUND SURFACE
- GROUNDWATER ELEVATION (2/18/13)
- LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
- FILL AND NATIVE SOIL CONTACT
- SCREEN
- BOTTOM OF BORING
- COAL TAR
- FINE TO COARSE SAND AND GRAVEL
- SILT AND SAND
- SILT AND CLAY
- ONONDAGA LIMESTONE

NOTE:

1. * CELL A REPRESENTS EXCAVATION LIMITS FOR THE FOURTH STREET UTILITY CORRIDOR EXCAVATION COMPLETED BY WSP ENGINEERING OF NEW YORK, P.C. ON BEHALF OF QLT BUFFALO LLC BETWEEN JUNE AND SEPTEMBER 2012.
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3. LOCATION OF SOUTH INTERCEPTOR COMBINATION SEWER FROM DESIGN DRAWINGS OBTAINED FROM THE CITY OF BUFFALO TITLED "WATERFRONT REDEVELOPMENT PROJECT NO. N.Y. R–35, UTILITY REPLACEMENT CONTRACT 1975".

VERTICAL EXAGGERATION = 5X

0 10' 20'

VERTICAL SCALE

0 50' 100'

HORIZONTAL SCALE

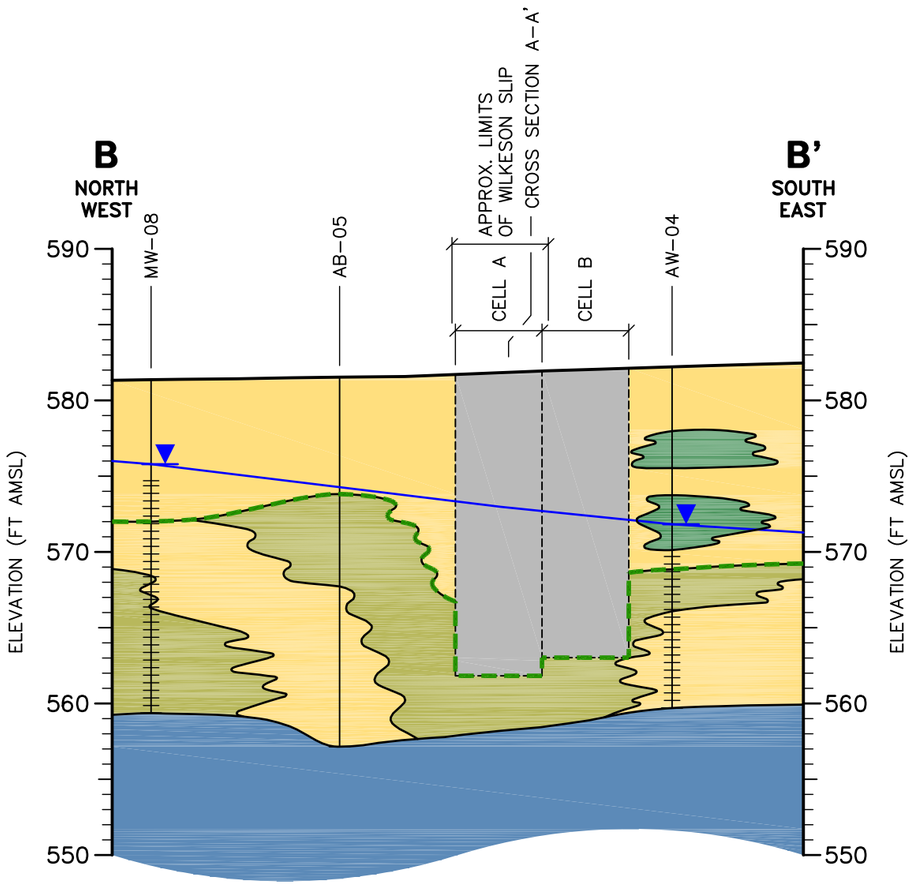
FORMER BUFFALO SERVICE STATION - OFF-SITE
BUFFALO, NEW YORK
SITE CHARACTERIZATION

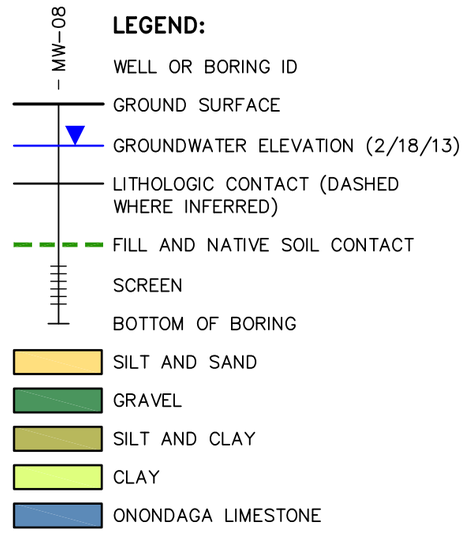
CROSS SECTION A-A'

ARCADIS

FIGURE
3

CITY:SYRACUSE_NY DIV/GROUP:ENV/MA-DIV DB:A.Schilling LD:(Opt) PIC:(Opt) PM:S. POWLIN TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENV\CAD\SYRACUSE\ACTIB\0023310\000000003\DWG\SITE-CHAR\23310V02.dwg LAYOUT: 3 SAVED: 12/17/2015 9:19 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: C-LB-PDF-ADOBE PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/17/2015 9:20 AM BY: ALLEN, ROYCE
XREFS: IMAGES: PROJECTNAME: ---
23310XBL 23310X02.jp2
23310X04.jp2





NOTE:

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VERTICAL EXAGGERATION = 5X

0 10' 20'

VERTICAL SCALE

0 50' 100'

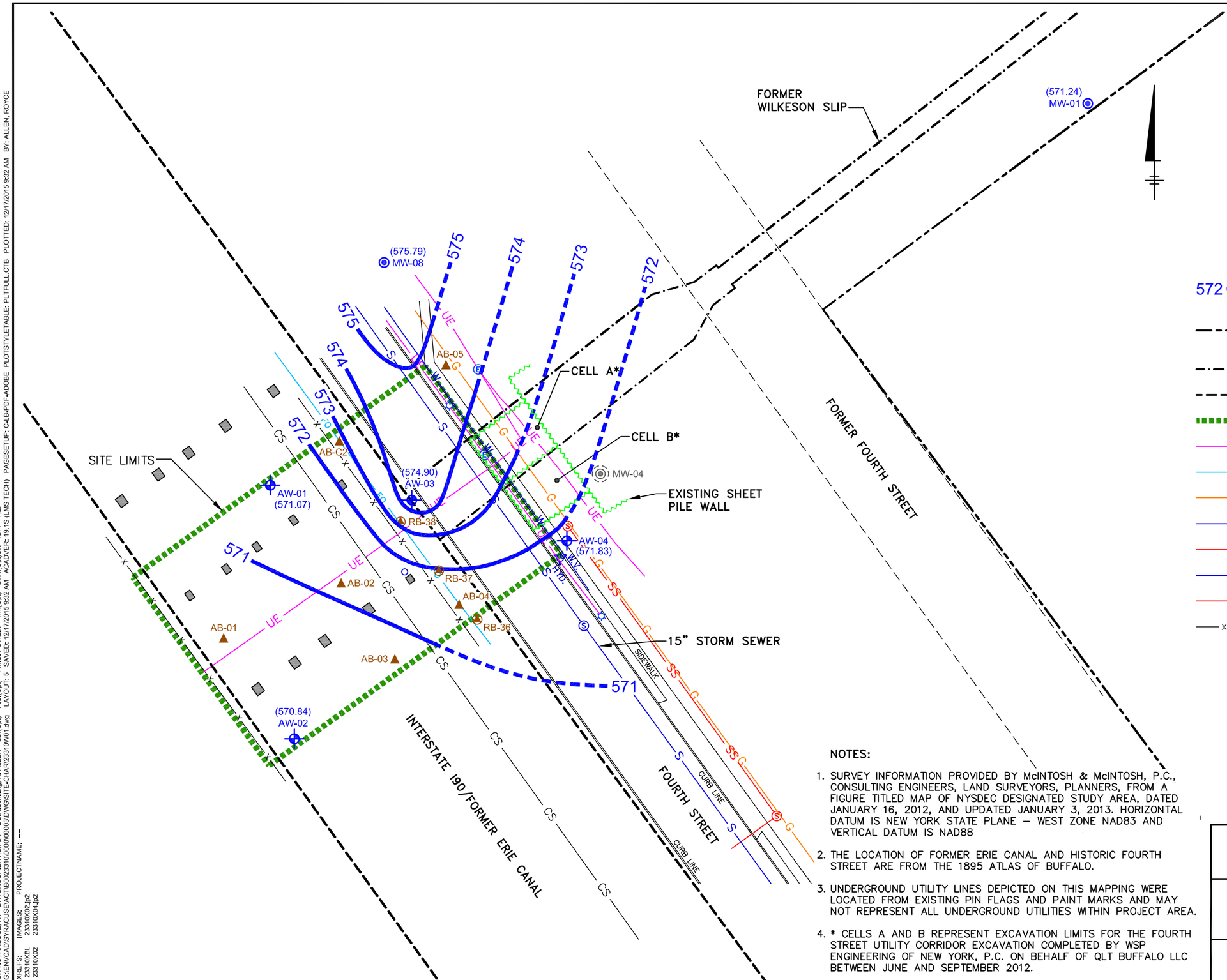
HORIZONTAL SCALE

FORMER BUFFALO SERVICE STATION - OFF-SITE
BUFFALO, NEW YORK
SITE CHARACTERIZATION

CROSS SECTION B-B'

ARCADIS

FIGURE
4



LEGEND:

- SOIL BORING
- PREVIOUS SOIL BORING DRILLED DURING INVESTIGATION OF FORMER BSS MGP
- MONITORING WELL
- PREVIOUS MONITORING WELL INSTALLED DURING INVESTIGATIONS OF THE FORMER BSS MGP
- DECOMMISSIONED MONITORING WELL
- (571.24) GROUNDWATER ELEVATION
- 572 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- FORMER NATIONAL FUEL BUFFALO SERVICE STATION MGP PROPERTY LINE
- FORMER WILKESON SLIP
- FORMER ERIE CANAL
- SITE LIMITS
- UE UNDERGROUND ELECTRIC
- FO FIBER OPTIC LINE
- G GAS
- W WATER
- SS SANITARY SEWER
- S STORM SEWER
- CS COMBINATION SEWER
- x x FENCE
- (S) SANITARY SEWER MANHOLE
- (E) ELECTRICAL MANHOLE
- W.V. WATER VALVE
- HYD. HYDRANT

0 50' 100'

GRAPHIC SCALE

NOTES:

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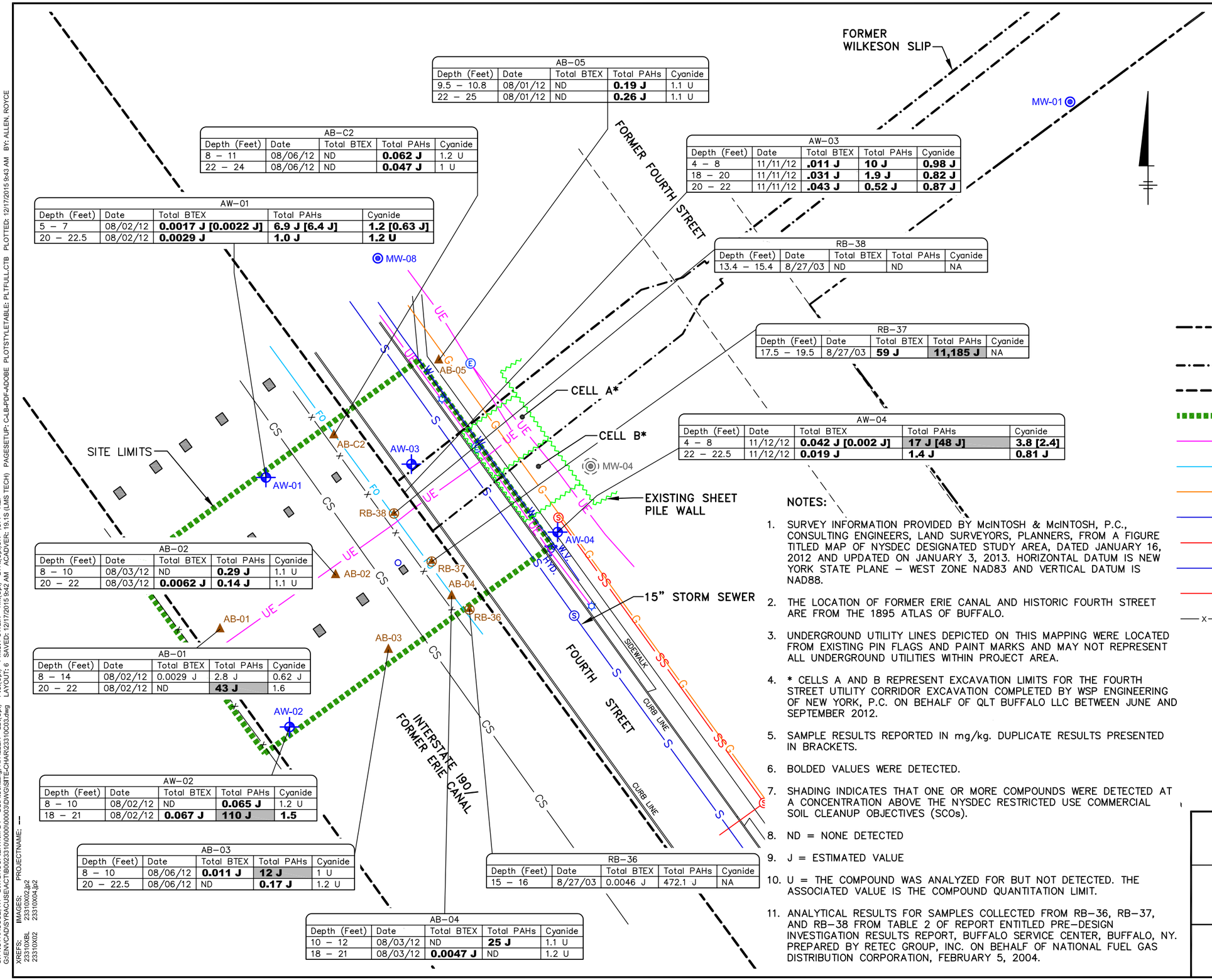
FORMER BUFFALO SERVICE STATION - OFF-SITE
BUFFALO, NEW YORK
SITE CHARACTERIZATION

GROUNDWATER ELEVATION CONTOURS-FEBRUARY 18, 2013

ARCADIS

FIGURE 5

CITY:SYRACUSE, NY DIV/GROUP:ENV/IM-DIV DB:A.Schilling, R. ALLEN LD:(Opt) PIC:(Opt) PM:S. POWLIN TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIB\00233100000000003\DWG\SITE-CHAR\23310W01.dwg LAYOUT: 5 SAVED: 12/17/2015 9:32 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: C-LB-PDF-ADOBE PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/17/2015 9:32 AM BY: ALLEN, ROYCE
XREFS: IMAGES: PROJECTNAME: ---
23310XBL 23310X02.jp2
23310X02 23310X04.jp2



AB–05

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
9.5 – 10.8	08/01/12	ND	**0.19 J**	1.1 U
22 – 25	08/01/12	ND	**0.26 J**	1.1 U

AB–C2

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
8 – 11	08/06/12	ND	**0.062 J**	1.2 U
22 – 24	08/06/12	ND	**0.047 J**	1 U

AW–03

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
4 – 8	11/11/12	**.011 J**	**10 J**	**0.98 J**
18 – 20	11/11/12	**.031 J**	**1.9 J**	**0.82 J**
20 – 22	11/11/12	**.043 J**	**0.52 J**	**0.87 J**

AW–01

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
5 – 7	08/02/12	**0.0017 J [0.0022 J]**	**6.9 J [6.4 J]**	**1.2 [0.63 J]**
20 – 22.5	08/02/12	**0.0029 J**	**1.0 J**	**1.2 U**

RB–38

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
13.4 – 15.4	8/27/03	ND	ND	NA

RB–37

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
17.5 – 19.5	8/27/03	**59 J**	**11,185 J**	NA

AW–04

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
4 – 8	11/12/12	**0.042 J [0.002 J]**	**17 J [48 J]**	**3.8 [2.4]**
22 – 22.5	11/12/12	**0.019 J**	**1.4 J**	**0.81 J**

AB–02

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
8 – 10	08/03/12	ND	**0.29 J**	1.1 U
20 – 22	08/03/12	**0.0062 J**	**0.14 J**	1.1 U

AB–01

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
8 – 14	08/02/12	0.0029 J	2.8 J	0.62 J
20 – 22	08/02/12	ND	**43 J**	1.6

AW–02

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
8 – 10	08/02/12	ND	**0.065 J**	1.2 U
18 – 21	08/02/12	**0.067 J**	**110 J**	**1.5**

AB–03

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
8 – 10	08/06/12	**0.011 J**	**12 J**	1 U
20 – 22.5	08/06/12	ND	**0.17 J**	1.2 U

RB–36

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
15 – 16	8/27/03	0.0046 J	472.1 J	NA

AB–04

Depth (Feet)	Date	Total BTEX	Total PAHs	Cyanide
10 – 12	08/03/12	ND	**25 J**	1.1 U
18 – 21	08/03/12	**0.0047 J**	ND	1.2 U

NOTES:

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5. SAMPLE RESULTS REPORTED IN mg/kg. DUPLICATE RESULTS PRESENTED IN BRACKETS.
6. BOLDED VALUES WERE DETECTED.
7. SHADING INDICATES THAT ONE OR MORE COMPOUNDS WERE DETECTED AT A CONCENTRATION ABOVE THE NYSDEC RESTRICTED USE COMMERCIAL SOIL CLEANUP OBJECTIVES (SCOs).
8. ND = NONE DETECTED
9. J = ESTIMATED VALUE
10. U = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
11. ANALYTICAL RESULTS FOR SAMPLES COLLECTED FROM RB–36, RB–37, AND RB–38 FROM TABLE 2 OF REPORT ENTITLED PRE–DESIGN INVESTIGATION RESULTS REPORT, BUFFALO SERVICE CENTER, BUFFALO, NY. PREPARED BY RETEC GROUP, INC. ON BEHALF OF NATIONAL FUEL GAS DISTRIBUTION CORPORATION, FEBRUARY 5, 2004.

LEGEND:

- SOIL BORING
- PREVIOUS SOIL BORING DRILLED DURING INVESTIGATION OF FORMER BSS MGP
- MONITORING WELL
- PREVIOUS MONITORING WELL INSTALLED DURING INVESTIGATIONS OF THE FORMER BSS MGP
- DECOMMISSIONED MONITORING WELL
- FORMER NATIONAL FUEL BUFFALO SERVICE STATION MGP PROPERTY LINE
- FORMER WILKESON SLIP
- FORMER ERIE CANAL
- SITE LIMITS
- UE — UNDERGROUND ELECTRIC
- FO — FIBER OPTIC LINE
- G — GAS
- W — WATER
- SS — SANITARY SEWER
- S — STORM SEWER
- CS — COMBINATION SEWER
- FENCE
- SANITARY SEWER MANHOLE
- E — ELECTRICAL MANHOLE
- W.V. — WATER VALVE
- HYD. — HYDRANT

0 50' 100'

GRAPHIC SCALE

FORMER BUFFALO SERVICE STATION - OFF-SITE
BUFFALO, NEW YORK
SITE CHARACTERIZATION

SOIL ANALYTICAL RESULTS - BTEX, PAHs, AND CYANIDE

ARCADIS

FIGURE 6

AW–01		
Date	8/22/12	8/27/13
Total BTEX	**0.58 J [0.55 J]**	ND
Total PAHs	**2.2 [2]**	**2.7 J**
Cyanide	**88 J [63 J]**	**87**

AW–03		
Date	12/28/2012	8/27/13
Total BTEX	**12 [12]**	**4.8[4.9]**
Total PAHs	**236 [236]**	**104 J [101 J]**
Cyanide	**110 [93]**	**110 [100]**

AW–02		
Date	8/22/12	8/27/13
Total BTEX	ND	ND
Total PAHs	**3.09**	**6.86 J**
Cyanide	20 UBJ	5 U

AW–04		
Date	12/28/2012	8/27/13
Total BTEX	**170**	**355 J**
Total PAHs	**7.1**	**18 J**
Cyanide	**11 J**	**64**

FORMER WILKESON SLIP

MW-01

MW-08

AB-05

CELL A*

CELL B*

MW-04

EXISTING SHEET PILE WALL

FORMER FOURTH STREET

SITE LIMITS

AW-01

AB-C2

AW-03

RB-38

AW-04

RB-37

AB-02

AB-04

RB-36

AB-01

AB-03

15" STORM SEWER

SIDEWALK

AW-02

INTERSTATE 190/FORMER ERIE CANAL

FOURTH STREET

CURB LINE

CURB LINE

NOTE:

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5. SAMPLE RESULTS REPORTED IN µg/L. DUPLICATE RESULTS PRESENTED IN BRACKETS.
6. BOLDED VALUES WERE DETECTED.
7. SHADING INDICATES THAT ONE OR MORE COMPOUNDS WERE DETECTED AT A CONCENTRATION ABOVE THE NYSDEC TOGS STANDARDS OR GUIDANCE VALUES.
8. ND = NONE DETECTED
9. J = ESTIMATED VALUE
10. U = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
11. B = ANALYTE WAS ALSO DETECTED IN THE ASSOCIATED METHOD BLANK.

LEGEND:

- SOIL BORING
- PREVIOUS SOIL BORING DRILLED DURING INVESTIGATION OF FORMER BSS MGP
- MONITORING WELL
- PREVIOUS MONITORING WELL INSTALLED DURING INVESTIGATIONS OF THE FORMER BSS MGP
- DECOMMISSIONED MONITORING WELL
- FORMER NATIONAL FUEL BUFFALO SERVICE STATION MGP PROPERTY LINE
- FORMER WILKESON SLIP
- FORMER ERIE CANAL
- SITE LIMITS
- UE — UNDERGROUND ELECTRIC
- FO — FIBER OPTIC LINE
- G — GAS
- W — WATER
- SS — SANITARY SEWER
- S — STORM SEWER
- CS — COMBINATION SEWER
- x — x — FENCE
- Ⓢ — SANITARY SEWER MANHOLE
- Ⓔ — ELECTRICAL MANHOLE
- O W.V. — WATER VALVE
- HYD. — HYDRANT

0 50' 100'

GRAPHIC SCALE

FORMER BUFFALO SERVICE STATION - OFF-SITE
BUFFALO, NEW YORK
SITE CHARACTERIZATION

GROUNDWATER ANALYTICAL RESULTS - BTEX, PAHs, AND CYANIDE

ARCADIS

FIGURE 7

CITY:SYRACUSE, NY DIV/GROUP:ENV/M-DV DB:A.Schilling, R. ALLEN LD:(Opt) PIC:(Opt) PM:S. POWLIN TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENV\CAD\SYRACUSE\ACTIVE\00233100\0000\00003\DWG\SITE-CHAR\23310C04.dwg LAYOUT: 7 SAVED: 12/17/2015 9:52 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: C-LB-PDF-ADOBE PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/17/2015 9:53 AM BY: ALLEN, ROYCE
XREFS: 23310XBL 23310X02 IMAGES: 23310X02.jp2 23310X04.jp2 PROJECTNAME: ---

ARCADIS

Appendix A

Soil Boring and Monitoring Well Construction Logs

Date Start/Finish: 7/31-8/2/2012
Drilling Company: Parratt Wolff, Inc.
Driller's Name: Layne Pech
Drilling Method: Hollow Stem Auger
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted IRA300/Percussion Hammer

Northing: 1051493.38
Easting: 1067397.49
Casing Elevation: NA

Borehole Depth: 22' bgs
Surface Elevation: 579.88' AMSL

Descriptions By: Nicholas (Klaus) Beyrle

Well/Boring ID: **AB-01**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	580	NA	0-2	NA	0.0			Dark gray to black fine to coarse SAND and very fine to medium subrounded to subangular GRAVEL, little Silt, little-trace Boulders. [FILL]	
		NA	2-4	NA	0.0			Trace Brick fragments at 2-4' bgs.	
5	575	NA	4-5	NA	NA				
		NA	5-6	0.1	NA			NO RECOVERY. ROCK in spoon tip.	
		1	6-8	0.0	NA				
		2	8-10	0.4	0.0			Brown CLAY, some Silt, little fine to medium Gravel, wet. Water table at 8' bgs. [FILL]	Borehole tremie-grouted to grade with cement/bentonite grout.
10	570	3	10-12	0.3	0.0			Gray broken ROCK fragments, wet. [FILL]	
		4	12-14	0.8	0.0			Brown CLAY and fine to coarse GRAVEL, soft, wet. [FILL]	
15	565	5	14-16	0.3	1.3			Very coarse angular GRAVEL covered in brown Silty CLAY. Black/dark gray Clayey SILT in tip of shoe, slight odor.	

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-14' bgs as AB-01 (8-14) and from 20-21' bgs as AB-01 (20-21) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

ARCADIS
Infrastructure, environment, buildings

Client: National Fuel

Well/Boring ID: **AB-01**

Borehole Depth: 22' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		6	16-18	0.6	0.0			Black to dark gray Clayey SILT and medium to very coarse angular GRAVEL, trace Fiber, soft, slight odor, moist.	
		7	18-20	1.0	0.0			Black/dark gray/gray Clayey SILT, trace Rootlets and Fiber, soft, low plasticity, moist.	Borehole tremie-grouted to grade with cement/bentonite grout.
20	560	8	20-22	0.8	1.6			Broken pieces of ROCK (Bedrock), spoon abandonment was at 20.5' bgs (top of weathered rock) and the tone of hammer changed at 21.6' bgs (competent bedrock).	
								End of boring at 22' bgs.	
25	555								
30	550								
35	545								

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-14' bgs as AB-01 (8-14) and from 20-21' bgs as AB-01 (20-21) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Date Start/Finish: 7/31-8/3/2012
Drilling Company: Parratt Wolff, Inc.
Driller's Name: Layne Pech
Drilling Method: Hollow Stem Auger
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted IRA300/Percussion Hammer

Northing: 1051521.84
Easting: 1067458.21
Casing Elevation: NA

Borehole Depth: 22.2' bgs
Surface Elevation: 580.33' AMSL

Descriptions By: Nicholas (Klaus) Beyrle

Well/Boring ID: **AB-02**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	580	NA	0-2	NA	0.0			Dark brown SILT and very fine SAND, little Clay and fine to medium angular Gravel, trace medium to very coarse Gravel, moist to dry. [FILL]	
		NA	2-4	NA	0.0			Trace red Brick fragments at 2-4' bgs.	
		NA	4-5	NA	0.0				
5	575	NA	5-6	0.0	NA			NO RECOVERY. Rock in spoon tip.	
		1	6-8	0.4	0.0			Broken ROCK fragments, wet. Water table at 8' bgs. [FILL]	
		2	8-10	0.8	0.0			Brown broken ROCK fragments covered in brown SILT, some Clay and very fine to medium angular Gravel, wet. [FILL]	Borehole tremie-grouted to grade with cement/bentonite grout.
10	570	3	10-12	0.8	0.0			Brown CLAY, little Silt, trace very fine to fine Sand, soft, moist to wet.	
		4	12-14	1.4	0.0				
15	565	5	14-16	0.7	0.0			Stiff, Sand is absent at 14-16' bgs.	

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-10' bgs as AB-02 (8-10) and from 20-22' bgs as AB-02 (20-22) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

ARCADIS
Infrastructure, environment, buildings

Client: National Fuel

Well/Boring ID: **AB-02**

Borehole Depth: 22.2' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		6	16-18	0.6	0.0			Brown SILT, trace Clay, very fine Sand and very coarse angular Gravel, fine to medium angular Gravel in tip of shoe.	
		7	18-20	1.4	0.0			Brown SILT, trace Clay, very fine Sand and very coarse angular Gravel.	Borehole tremie-grouted to grade with cement/bentonite grout.
20	560	8	20-22	0.7	0.0			Dark gray broken ROCK fragments.	
		9	22-22.2	0.2	0.0			BEDROCK. Spoon refusal at 22.2' bgs.	
								End of boring at 22.2' bgs.	
25	555								
30	550								
35	545								

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-10' bgs as AB-02 (8-10) and from 20-22' bgs as AB-02 (20-22) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Date Start/Finish: 7/31-8/6/2012
Drilling Company: Parratt Wolff, Inc.
Driller's Name: Layne Pech
Drilling Method: Hollow Stem Auger
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted IRA300/Percussion Hammer

Northing: 1051482.58
Easting: 1067485.96
Casing Elevation: NA

Borehole Depth: 22.5' bgs
Surface Elevation: 580.35' AMSL

Descriptions By: Nicholas (Klaus) Beyrle

Well/Boring ID: **AB-03**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	580	NA	0-2	NA	NA			Fine to very coarse angular GRAVEL. [FILL]	
		NA	2-4	NA	NA			Very little matrix amid all the rocks.	
		NA	4-5	NA	NA				
5	575	NA	5-6	NA	0.0			Brown/black medium to fine SAND and SILT, some very fine to medium subangular Gravel, trace very coarse Gravel, Rock in tip of shoe. [FILL]	
		1	6-8	0.9	1.6			ROCK in spoon tip.	
		2	8-10	0.8	0.0			Brown SILT, trace Clay, wet. Water at 8' bgs. [FILL]	Borehole tremie-grouted to grade with cement/bentonite grout.
10	570	3	10-12	0.5	0.0			Dark brown Clayey SILT, little to trace very fine to medium subrounded to subangular Gravel, low plasticity, soft, moist. [FILL]	
		4	12-14	0.7	0.0			COAL. [FILL] Black FRAGMENTS. [FILL]	
15	565	5	14-16	0.4	0.0			Brown CLAY, high plasticity, stiff, moist.	

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-10' bgs as AB-03 (8-10) and from 20-22.5' bgs as AB-03 (20-22.5) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Client: National Fuel

Well/Boring ID: **AB-03**

Borehole Depth: 22.5' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		6	16-18	1.1	0.0			Brown CLAY, high plasticity, stiff, moist. Stiff at 16-16.3' bgs and 16.5-16.6' bgs, otherwise medium stiff at 16-18' bgs.	
		7	18-20	0.7	0.0			Stff between 18-20' bgs.	Borehole tremie-grouted to grade with cement/bentonite grout.
20	560	8	20-22	1.4	0.0			Brown CLAY, high plasticity, stiff, moist. Color of CLAY is brown to black at 20.3-21' bgs, white at 21-21.1' bgs and brown at 21.1-21.5' bgs.	
		9	22-22.5	0.5	0.0			Piece of broken rock (BEDROCK). Spoon refusal at 22.5' bgs.	
								End of boring at 22.5' bgs.	
25	555								
30	550								
35	545								

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-10' bgs as AB-03 (8-10) and from 20-22.5' bgs as AB-03 (20-22.5) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Date Start/Finish: 8/1-8/3/2012
Drilling Company: Parratt Wolff, Inc.
Driller's Name: Layne Pech
Drilling Method: Hollow Stem Auger
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted IRA300/Percussion Hammer

Northing: 1051510.80
Easting: 1067519.16
Casing Elevation: NA

Borehole Depth: 21' bgs
Surface Elevation: 581.79' AMSL

Descriptions By: Nicholas (Klaus) Beyrle

Well/Boring ID: **AB-04**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0 / 580	NA	0-2	NA	NA			Dark brown fine to coarse SAND, SILT and very fine to medium angular GRAVEL. [FILL]	
	NA	2-4	NA	NA				
	NA	4-5	NA	NA				
5	NA	5-6	0.5	0.0			Brown fine to coarse SAND and stiff very fine to medium subrounded to subangular GRAVEL, some Silt, moist to dry. [FILL]	
575	1	6-8	0.5	0.0			Brown/gray SILT, trace Clay and Gravel, soft, moist.	
	2	8-10	2.0	0.0			Dark brown SILT, some Organic material, trace Wood pieces.	
							Gray/black-gray SILT, medium soft, vein of stained material (2.3 mm wide and 0.2' long), odor at 9.8-10' bgs.	
10	3	10-12	1.6	0.0			Gray/black-gray SILT, medium soft, trace areas of black staining with odor, some stains connect to form "veins" ranging from 2-4 mm wide, longest one is 0.2', moist.	
570							Gray Silt, little trace Clay, no staining, moist at 11.4-11.6' bgs.	
	4	12-14	0.9	0.0			Trace sheen on water at 12.3-12.45' bgs.	
							Dark brown Clayey SILT, trace Rootlets and very fine Sand, soft, moist.	
15	5	14-16	1.0	0.0			Gray very fine SAND and SILT.	

Borehole tremie-grouted to grade with cement/bentonite grout.

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 10-12' bgs as AB-04 (10-12) and from 18-21' bgs as AB-04 (18-21) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

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Client: National Fuel

Well/Boring ID: **AB-04**

Borehole Depth: 21' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	565	6	16-18	0.6	0.0			Brown/pink to brown Clayey SILT and very fine SAND, trace very fine to medium subangular Gravel, medium soft, moist.	
		7	18-20	1.2	0.0			Brown/pink-brown SILT, some Clay, little very fine Sand, firm, low plasticity, moist.	Borehole tremie-grouted to grade with cement/bentonite grout.
20		8	20-21	0.7	0.0			Brown and gray mottled alternating layers of Silty CLAY and SILT. Silty CLAY layers are approximately 0.02' thick. Brown Clayey SILT, Rock fragments in the tip of shoe, moist at 20.5-20.7' bgs.	
	560							Spoon refusal at 21' bgs, bedrock at 21' bgs is confirmed by sending auger down the borehole. End of boring at 21' bgs.	
25									
	555								
30									
	550								
35									

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 10-12' bgs as AB-04 (10-12) and from 18-21' bgs as AB-04 (18-21) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Date Start/Finish: 7/31-8/1/2012
Drilling Company: Parratt Wolff, Inc.
Driller's Name: Layne Pech
Drilling Method: Hollow Stem Auger
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted IRA300/Percussion Hammer

Northing: 1051634.58
Easting: 1067512.36
Casing Elevation: NA

Borehole Depth: 25' bgs
Surface Elevation: 580.88' AMSL

Descriptions By: Nicholas (Klaus) Beyrle

Well/Boring ID: **AB-05**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0 / 580	1	0-2	NA	NA			Coarse GRAVEL and ROAD base on top of geotech fabric. [FILL]	
							CONCRETE. [FILL]	
	2	2-4	NA	NA			Dark gray SILT, little Clay, trace very fine to fine Gravel, hard, dense, moist to dry. [FILL]	
	3	4-5	NA	NA				
5 / 575	4	5-6	NA	NA			No descriptions recorded.	
	5	6-8	0.0	NA			No Recovery.	
	6	8-10	0.1	0.0			Dark gray medium to coarse SAND and Clayey SILT, trace fine to medium rounded Gravel, moist.	Borehole tremie-grouted to grade with cement/bentonite grout.
10 / 570	7	10-12	1.6	0.0			Dark gray SILT, trace Clay, wet at 10-10.8' bgs, saturated at 10.8-11.6' bgs. Water at 10.8' bgs.	
							Loose between 12-12.8' bgs.	
	8	12-14	2.0	0.0			Black SILT and ORGANIC material, trace Rootlets.	
							Gray very fine to fine SAND, wet.	
							Gray fine SAND, saturated.	
15 / 565	9	14-16	2.0	0.0			Brown with gray mottled CLAY, semi-soft, moist.	

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 9.5-10.8' bgs as AB-05 (9.5-10.8) and from 22-25' bgs as AB-05 (22-25) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

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Client: National Fuel

Well/Boring ID: **AB-05**

Borehole Depth: 25' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		10	16-18	2.0	0.0			Gray very fine to fine SAND and SILT, dilatent, saturated.	
		11	18-20	0.6	0.0			Gray fine to very fine SAND and SILT, dilatent, saturated.	
20	560							Brown CLAY, trace Silt, medium stiff.	Borehole tremie-grouted to grade with cement/bentonite grout.
		12	20-22	2.0	0.0			Light gray fine to medium SAND and SILT, little to trace very fine to medium rounded Gravel, soft, moist.	
		13	22-24	0.8	0.0				
		14	24-25	0.0	0.0			ROCK fragments, gray fine to medium SAND and SILT. Refusal at 25' bgs. BEDROCK at 25' bgs.	
25	555							End of boring at 25' bgs.	
30	550								
35	545								

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 9.5-10.8' bgs as AB-05 (9.5-10.8) and from 22-25' bgs as AB-05 (22-25) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Date Start/Finish: 8/1-8/6/2012
Drilling Company: Parratt Wolff, Inc.
Driller's Name: Layne Pech
Drilling Method: Hollow Stem Auger
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted IRA300/Percussion Hammer

Northing: 1051595.26
Easting: 1067457.28
Casing Elevation: NA

Borehole Depth: 24.2' bgs
Surface Elevation: 581.63' AMSL

Descriptions By: Nicholas (Klaus) Beyrle

Well/Boring ID: **AB-C2**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0 / 580	NA	0-2	NA	0.0			TOPSOIL. [FILL] Coarse ASPHALT and ROCK debris. [FILL] CONCRETE. [FILL]	
	NA	2-4	NA	0.0			Brown Clayey SILT, little to trace fine to medium angular Gravel, trace Boulders, moist to dense. [FILL]	
	NA	4-5	NA	0.0				
5	NA	5-6	0.9	0.0			Brown fine to coarse SAND and fine to medium subangular GRAVEL, little Silt, dry. [FILL]	
575	1	6-8	2.0	0.0			Gray SILT, little to trace Clay, trace orange mottling, stiff, moist. Medium stiff at 6.78' bgs. At 7.3, 0.5" wide layer of black Organic material (rootlets).	
	2	8-10	0.2	0.0				Borehole tremie-grouted to grade with cement/bentonite grout.
10	3	10-12	1.7	0.0			Gray SILT, trace Clay, soft, low plasticity, moist. Wet at 11.4-11.7' bgs. Water at 11' bgs.	
570	4	12-14	1.7	0.0			Little to trace very fine SAND, trace Rootlets, moist to wet at 12-14' bgs.	
15	5	14-16	1.8	1.3				

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Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-11' bgs as AB-C2 (8-11) and from 22-24' bgs as AB-C2 (22-24) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Client: National Fuel

Well/Boring ID: **AB-C2**

Borehole Depth: 24.2' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
565							Gray SILT, trace Clay, soft, low plasticity, moist.	
	6	16-18	1.4	0.0			Brown SILT, wet.	
	7	18-20	1.1	0.0			Red, brown and gray mottled Silty CLAY, stiff, low plasticity.	
20	8	20-22	2.0	0.0				Borehole tremie-grouted to grade with cement/bentonite grout.
560							Brown/gray to brown very fine to medium SAND and medium to very coarse rounded GRAVEL, moist.	
	9	22-24	1.8	0.0				
	10	24-24.2	0.2	NA			ROCK fractured. Spoon refusal at 24.2' bgs.	
25							End of boring at 24.2' bgs.	
555								
30								
550								
35								

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-11' bgs as AB-C2 (8-11) and from 22-24' bgs as AB-C2 (22-24) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Date Start/Finish: 8/1-8/2/2012
Drilling Company: Parratt Wolff, Inc.
Driller's Name: Layne Pech
Drilling Method: Hollow Stem Auger
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted IRA300/Percussion Hammer

Northing: 1051573.06
Easting: 1067421.63
Casing Elevation: 580.21' AMSL

Borehole Depth: 23.5' bgs
Surface Elevation: 580.57' AMSL

Descriptions By: Nicholas (Klaus) Beyrle

Well/Boring ID: **AW-01**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	580	NA	0-2	NA	0.0			Coarse GRAVEL/ASPHALT. [FILL]
								COBBLES (Limestone). [FILL]
		NA	2-4	NA	NA			Mainly large COBBLES and BRICK, very little matrix of dark gray/brown fine to coarse Sand and Silt and very fine to medium gravel, moist to dry. [FILL]
		NA	4-5	NA	NA			
5	575	NA	5-7	2.0	0.0			Gray very fine to coarse angular GRAVEL and medium to coarse SAND, trace fine Sand and Silt, dry. [FILL]
								Brown very fine to medium SAND, trace fine to medium rounded Gravel, dry to moist. [FILL]
		1	7-8	0.0	NA			Brown/tan brown CLAY, trace Silt and very fine Gravel, plasticity, medium stiff, moist. [FILL]
								NO RECOVERY.
		2	8-10	0.0	NA			NO RECOVERY. Rock in tip of shoe. [FILL]
10	570	3	10-12	0.05	0.0			Brown very fine to medium GRAVEL and fine to coarse SAND, dry. Water on rods at about 10' bgs. [FILL]
		4	12-14	0.3	0.0			Brown very fine to medium GRAVEL and fine to coarse SAND, some Silt, little to trace Clay, brittle, dry. Spoons are pushing material out of way easily. [FILL]
15	565	5	14-16	0.3	0.0			Brown CLAY, some Silt, trace very fine Sand and fine to medium Gravel, moist.

Well/Boring Construction

- Steel flushmount cover
- Locking J-Plug
- Concrete Pad (0-0.5' bgs)
- Sand Drain (0.5-1.5' bgs)
- Neat Cement Grout (1.5-9.5' bgs)
- 2" Sch 40 PVC Riser (0.5-13.5' bgs)
- Bentonite Pellets (9.5-11.5' bgs)
- #0 Silica Sand Pack (11.5-23.5' bgs)
- 2" Sch 40 PVC 0.010" Slot Screen (13.5-23.5' bgs)

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 5-7' bgs as AW-01 (5-7) and from 20-22.5' bgs as AW-01 (20-22.5) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Client: National Fuel

Well/Boring ID: **AW-01**

Borehole Depth: 23.5' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
								Brown CLAY, some Silt, trace very fine Sand and fine to medium Gravel, moist.	
		6	16-18	1.3	0.0			Brown/Black varved SILT, trace very fine Sand and Clay, medium stiff, moist.	#0 Silica Sand Pack (11.5-23.5' bgs)
		7	18-20	1.4	0.0			Brown/gray CLAY, trace Silt and fine to medium rounded Gravel, soft, moist.	2" Sch 40 PVC 0.010" Slot Screen (13.5-23.5' bgs)
20	560	8	20-22	0.4	0.0				
		9	22-23.5	0.6	0.0			Broken ROCK fragments. Spoon refusal at 22.5' bgs. Augers sent down to 23.5' bgs, BEDROCK at 23.5' bgs.	
								End of boring at 23.5' bgs.	
25	555								
30	550								
35	545								

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 5-7' bgs as AW-01 (5-7) and from 20-22.5' bgs as AW-01 (20-22.5) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Date Start/Finish: 7/31-8/2/2012
Drilling Company: Parratt Wolff, Inc.
Driller's Name: Layne Pech
Drilling Method: Hollow Stem Auger
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted IRA300/Percussion Hammer

Northing: 1051442.05
Easting: 1067434.05
Casing Elevation: 580.22' AMSL

Borehole Depth: 21' bgs
Surface Elevation: 580.50' AMSL

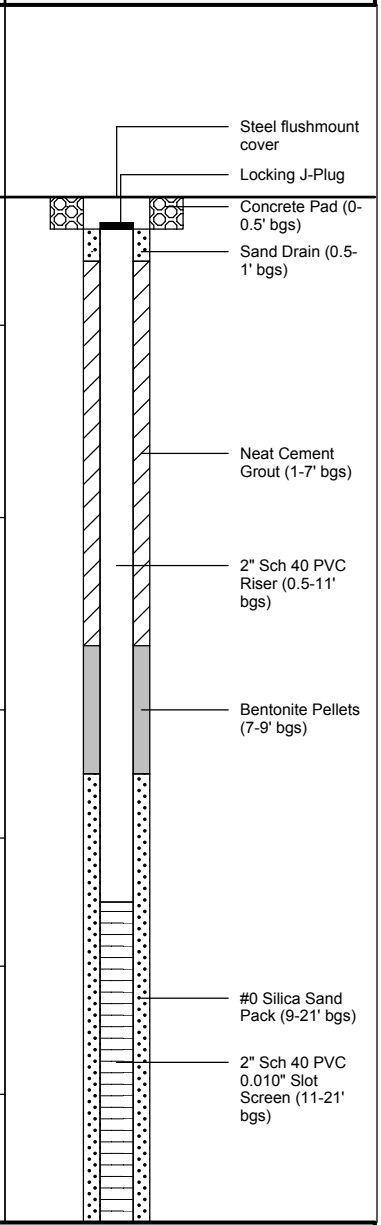
Descriptions By: Nicholas (Klaus) Beyrle

Well/Boring ID: **AW-02**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	580	NA	0-2	NA	0.0			Dark brown to black CLAY and SILT, some fine to coarse angular Gravel, trace Boulders. Coarse GRAVEL and ASPHALT between 0-1' bgs. [FILL]
		NA	2-4	NA	0.0			Dark brown to black fine to coarse SAND and fine to very coarse GRAVEL, trace Silt, dry to moist. [FILL]
		NA	4-5	NA	0.0			
5	575	NA	5-6	0.25	0.0			ROCK fragments in tip of shoe, dry. [FILL]
		1	6-8	0.2	0.0			
		2	8-10	1.1	0.0			Black Silty CLAY, trace medium to fine angular Gravel, soft, medium plasticity, moist. [FILL]
10	570	3	10-12	0.2	0.0			Brown CLAY, fine to coarse angular Gravel, wet. Water table at 10' bgs.
		4	12-14	1.6	0.0			Brown CLAY, some Silt, little to trace fine to medium angular Gravel, trace medium sand between 12.5-12.9' bgs, soft.
15	565	5	14-16	2.0	6.4			Brown between14-14.3' bgs and black between 14.3-16' bgs Clayey SILT, trace very fine Sand and tiny Fibers throughout, soft, slight odor, moist.



Well/Boring Construction

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-10' bgs as AW-02 (8-10) and from 18-21' bgs as AW-02 (18-21) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

Client: National Fuel

Well/Boring ID: **AW-02**

Borehole Depth: 21' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		6	16-18	1.4	4.8			Brown at 14-14.3' bgs and black at 14.3-16' bgs Clayey SILT, trace very fine Sand and tiny Fibers throughout, soft, slight odor, moist. Piece of wood in shoe, smells like Pine at 16-17.1' bgs.	#0 Silica Sand Pack (9-21' bgs)
		7	18-20	1.0	14.1			No wood, trace fine fibers still present at 18-20' bgs.	2" Sch 40 PVC 0.010" Slot Screen (11-21' bgs)
20	560	8	20-21	0.4	9.6			Some of the fibers are little longer and appear to be wood. Spoon refusal at 21' bgs.	
								End of boring at 21' bgs.	
25	555								
30	550								
35	545								

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Samples collected from 8-10' bgs as AW-02 (8-10) and from 18-21' bgs as AW-02 (18-21) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

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Date Start/Finish: 11/11/12
Drilling Company: Parrott Wolff
Driller's Name: Shawn Bodah
Drilling Method: Direct Push
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted Geoprobe

Northing: 1051565.39
Easting: 1067494.69
Casing Elevation: 581.44' AMSL

Borehole Depth: 23.5' bgs
Surface Elevation: 581.96' AMSL

Descriptions By: Jeff Brayer

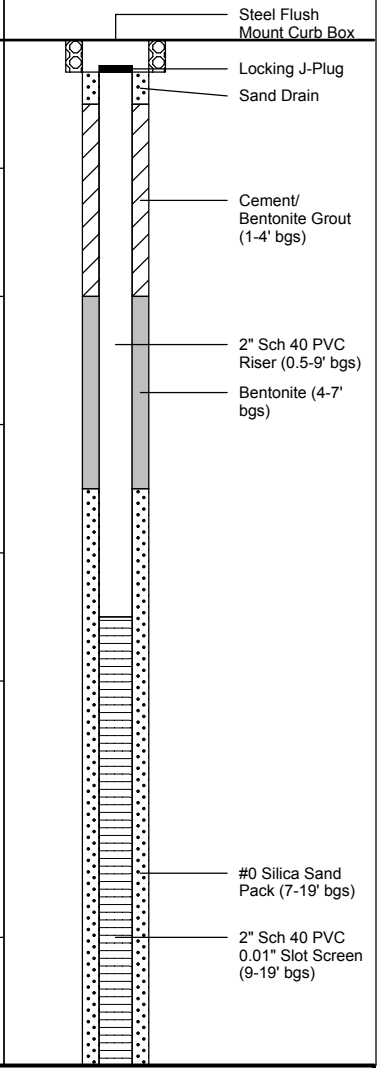
Well/Boring ID: **AW-03**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0							
580	1	NA	NA	0.0			Brown crushed CONCRETE, SLAG-like material and SAND, some Silt and Organics, moist. [FILL]
							Brown crushed CONCRETE, SLAG-like material and SAND, some Silt and Cobble, moist. [FILL] Hard digging.
5							Dark brown coarse GRAVEL, some medium Sand and Slag-like material, trace Silt, moist. [FILL]
575	2	6-8	0.3	0.0			Coarse angular GRAVEL and coarse SAND, Shale rock fragments, wet at 6.2' bgs. [FILL]
	3	8-10	1.2	0.0			Fine to coarse GRAVEL, some Slag-like material and medium Shale rock fragments, wet. [FILL]
10	4	10-12	0.7	0.0			Red to brown fine to coarse GRAVEL, angular SLAG-like material (pitted and brittle), fine SAND and angular SHALE rock fragments. [FILL]
570	5	12-14	0.3	0.0			
15	6	14-16	0.9	0.0			Clayey SILT and black PLASTIC, some Organic (plant matter) and Wood, trace fine Sand.

Well/Boring Construction



Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Analytical samples were collected: AW-03 (4-8), AW-03 (18-20) and AW-03 (20-22) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

ARCADIS
Infrastructure, environment, buildings

Client: National Fuel

Well/Boring ID: **AW-03**

Borehole Depth: 23.5' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	565	7	16-18	0.2	0.0			SHALE (rock fragments) and ORGANIC, Rock stuck in split spoon.	
		8	18-20	1.9	3.2			Brown Silty CLAY, low plasticity, solvent-like smell. Red-brown Silty CLAY and medium SAND, laminated with Sand lense from 19.5' - 20.0' bgs, solvent-like smell.	#0 Silica Sand Pack (7-19' bgs) 2" Sch 40 PVC 0.01" Slot Screen (9-19' bgs)
20		9	20-22	2.0	0.4			Brown Silty CLAY, trace Gravel at 22.0' bgs, petroleum-like odor. Brown CLAY, lamination of medium Sand, trace Gravel at 22' bgs, stiff, Shale rock stuck in split spoon shoe.	2" Sch 40 PVC Sump (19-21' bgs) Grout (19-23.5' bgs)
	560	10	22-24	1.0	0.2				
								Refusal at 23.5' bgs	
25									
	555								
30									
	550								
35									

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Analytical samples were collected: AW-03 (4-8), AW-03 (18-20) and AW-03 (20-22) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

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Date Start/Finish: 11/12/12
Drilling Company: Parrott Wolff
Driller's Name: Shawn Bodah
Drilling Method: Direct Push
Sampling Method: 2" / 3" x 2' Split Spoon
Rig Type: Truck Mounted Geoprobe

Northing: 1051544.36
Easting: 1067574.83
Casing Elevation: 581.95' AMSL

Borehole Depth: 22.5' bgs
Surface Elevation: 582.19' AMSL

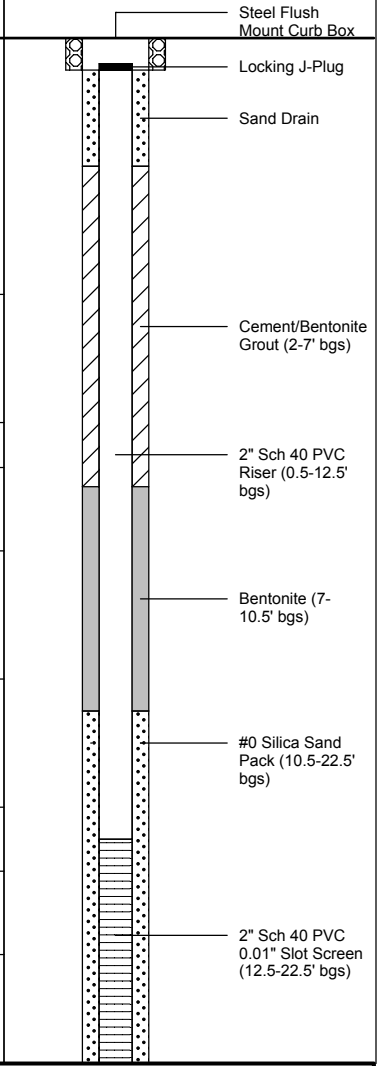
Descriptions By: Jeff Brayer

Well/Boring ID: **AW-04**

Client: National Fuel

Location: Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
585							
0							
	1	NA	NA	0.0			SILT and coarse SAND, red Brick (pieces), Clay pipe fragments and Organic material, moist. [FILL]
580							Coarse Gravel/Slag-like material.
							Dark brown coarse GRAVEL, some medium Sand and Slag like-material, trace Silt, moist. [FILL]
5							
	2	6-8	2.0	0.0			SILT, black Organic layer, trace Clay, wet.
575							Brown to yellow fine Silty SAND.
	3	8-10	0.5	0.0			Medium to coarse GRAVEL, some fine to coarse Sand, trace Silt.
10							
	4	10-12	2.0	0.0			Grey to red-brown fine to coarse GRAVEL, fine to medium Sand, trace Wood fibers, wet.
570							
	5	12-14	2.0	0.0			Brown fine Silty SAND and ORGANIC (wood and straw).
							Black SILT, trace fine Sand and Organic (plant fibers and immature peat).
	6	14-16	1.6	0.0			Black SILT and CLAY, trace brown to red fine Sand and Silt, medium plasticity, wet.
15							



Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Analytical samples were collected: AW-04 (4-8) and AW-04 (22-22.5) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

ARCADIS
Infrastructure, environment, buildings

Client: National Fuel

Well/Boring ID: **AW-04**

Borehole Depth: 22.5' bgs

Site Location:
Former Wilkson Slip/Canal Area
Buffalo, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		7	16-18	2.0	0.0			Black to brown SAND and SILT, laminated medium to fine Sand, Silt, and Organic (fibers).	#0 Silica Sand Pack (10.5-22.5' bgs)
	565							Black to brown CLAY, some Silt, high plasticity.	
		8	18-20	2.0	0.0			Brown SAND and SILT, wet.	
20									2" Sch 40 PVC 0.01" Slot Screen (12.5-22.5' bgs)
		9	20-22	2.0	0.0			Brown SAND and SILT, vertical seams of black Sand, discoloration, wet.	
								Brown SILT, trace fine Sand.	
	560	10	22-24	0.5	8.5	X		Red-brown CLAY, laminated Silt, Bedrock in tip of sampler, stiff, gasoline/fuel oil-like odor.	
								Refusal at 22.5' bgs	
25									
	555								
30									
	550								
35									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Analytical samples were collected: AW-04 (4-8) and AW-04 (22-22.5) for analysis of TCL VOC, TCL SVOC, Cyanide, Free Cyanide, Mercury, TAL Metals.

Soil boring was hand-cleared to 5' bgs prior to drilling.

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Appendix B

Data Usability Summary Reports

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Imagine the result

National Fuel

Data Usability Summary Report (DUSR)

BUFFALO, NEW YORK

Volatile, Semivolatile, Metals, and Miscellaneous Analyses

SDG #480-23453

Analyses Performed By:
TestAmerica Laboratories
Buffalo, New York

Report #17412R
Review Level: Tier III
Project: B0023310.0000.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #480-23453 for samples collected in association with the National Fuel Wilkenson Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
AB-05 (9.5-10.8)	480-23453-1	Soil	8/1/2012		X	X		X	X
AB-05 (22-25)	480-23453-2	Soil	8/1/2012		X	X		X	X
AB-01 (8-14)	480-23453-3	Soil	8/2/2012		X	X		X	X
AB-01 (20-22)	480-23453-4	Soil	8/2/2012		X	X		X	X
AW-02 (8-10)	480-23453-5	Soil	8/2/2012		X	X		X	X
AW-02 (18-21)	480-23453-6	Soil	8/2/2012		X	X		X	X
AW-01 (5-7)	480-23453-7	Soil	8/2/2012		X	X		X	X
AW-01 (20-22.5)	480-23453-8	Soil	8/2/2012		X	X		X	X
RB-080212	480-23453-9	Water	8/2/2012		X	X		X	X
AB-04 (10-12)	480-23453-10	Soil	8/3/2012		X	X		X	X
TRIP BLANK	480-23453-11	Water	8/3/2012		X				
DUP-080212	480-23453-12	Soil	8/2/2012	AW-01 (5-7)	X	X		X	X
AB-04 (18-21)	480-23453-13	Soil	8/3/2012		X	X		X	X
AB-02 (8-10)	480-23453-14	Soil	8/3/2012		X	X		X	X
AB-02 (20-22)	480-23453-15	Soil	8/3/2012		X	X		X	X
AB-03 (8-10)	480-23564-1	Soil	8/6/2012		X	X		X	X
AB-03- (20-22.5)	480-23564-2	Soil	8/6/2012		X	X		X	X
AB-C2 (8-11)	480-23564-3	Soil	8/6/2012		X	X		X	X
AB-C2 (22-24)	480-23564-4	Soil	8/6/2012		X	X		X	X

Note:

1. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location AW-02 (18-21).
2. Miscellaneous parameters include total and free cyanide.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 8260B and 8270C as referenced in NYSDEC-ASP. Data were reviewed in accordance with USEPA Region II SOP HW-24 - Validating Volatile Organic Compounds by SW-846 Method 8260B of October 2006 and New York State ASP 2005.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260B	Water	14 days from collection to analysis (7 days if unpreserved)	Cool to 4°C±2°C; preserved to a pH of less than 2 s.u.
	Soil	14 days from collection to analysis	Cool to 4°C±2°C.

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the compounds listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (B) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
AB-05 (9.5-10.8) AB-01 (8-14)	Acetone	Detected sample results <RL and <BAL	"UB" at the RL
AB-05 (22-25)	Acetone	Detected sample results >RL and <BAL	"UB" at detected sample concentration
AB-01 (20-22) AW-01 (5-7) DUP-080212 AB-03- (20-22.5) AB-C2 (8-11) AB-C2 (22-24)	Xylenes, total		

RL Reporting limit

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
AB-03 (8-10) AB-03- (20-22.5) AB-C2 (8-11) AB-C2 (22-24)	CCV %D	Dichlorodifluoromethane	-20.3%
		Bromomethane	-28.1%
		Chloroethane	-22.1%
		Trichlorofluoromethane	-20.6%
RB-080212 TRIP BLANK	CCV %D	Dichlorodifluoromethane	-27.8%
		Bromomethane	-40.7%
		Chloroethane	-24.4%
		Trichlorofluoromethane	-21.3%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J

Initial/Continuing	Criteria	Sample Result	Qualification
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 15% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD >90%	Non-detect	R
		Detect	J
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample Locations	Compound
AW-02 (18-21)	All compounds

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery
AB-05 (9.5-10.8) AB-05 (22-25) AB-01 (8-14) AB-01 (20-22) AW-02 (8-10) AW-02 (18-21) AW-01 (5-7) AW-01 (20-22.5) AB-04 (10-12) DUP-080212 AB-04 (18-21) AB-02 (8-10) AB-02 (20-22)	Methyl acetate	>UL

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-01 (5-7)/ DUP-080212	Acetone	13 J	14 J	AC
	Cyclohexane	2.1 J	1.8 J	AC
	Methylcyclohexane	2.7 J	2 J	AC
	Toluene	1.7 J	2.2 J	AC

AC - Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks		X		X	
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X	X		
Laboratory Control Sample Duplicate(LCSD)					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS)		X		X	
Matrix Spike Duplicate(MSD)		X		X	
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present				X	

VOCs: SW-846 8260B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
E. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270C	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cooled @ 4°C ± 2°C
	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cooled @ 4°C ± 2°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/ Continuing	Compound	Criteria
RB-080212	CCV %D	2-Nitroaniline	22.2%
		4-Nitrophenol	25.8%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 15% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD >90%	Non-detect	R
		Detect	J
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

Sample locations associated with surrogates exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Surrogate	Recovery
AW-02 (8-10) AB-04 (10-12)	2,4,6-Tribromophenol	AC
	2-Fluorobiphenyl	AC
	2-Fluorophenol	AC
	Nitrobenzene-d5	AC
	p-Terphenyl-d14	<LL but >10%
	Phenol-d5	AC
AB-02 (8-10)	2,4,6-Tribromophenol	<LL but >10%
	2-Fluorobiphenyl	AC
	2-Fluorophenol	AC
	Nitrobenzene-d5	AC
	p-Terphenyl-d14	AC
	Phenol-d5	AC

UL Upper control limit
AC Acceptable

The criteria used to evaluate the surrogate recoveries are presented in the following table. In the case of a surrogate deviation, the sample results associated with the deviant fraction are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	No Action
	Detect	J
< LL but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Surrogates diluted below the calibration curve due to the high concentration of a target compounds	Non-detect	J[1]
	Detect	

[1] A more concentrated analysis was not performed with surrogate compounds within the calibration range; therefore, no determination of extraction efficiency could be made.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
AW-02 (18-21)	Pyrene	<10%	<10%
	4-Nitrophenol	AC	>UL

AC Acceptable

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

8. Laboratory Control Sample (LCS/) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery
AB-05 (9.5-10.8) AB-05 (22-25) AB-01 (8-14) AB-01 (20-22) AW-02 (8-10) AW-02 (18-21) AW-01 (5-7) AW-01 (20-22.5) AB-04 (10-12) DUP-080212 AB-04 (18-21) AB-02 (8-10) AB-02 (20-22) AB-03 (8-10) AB-03- (20-22.5) AB-C2 (8-11) AB-C2 (22-24)	N-Nitrosodiphenylamine	>UL

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-01 (5-7)/ DUP-080212	2-Methylnaphthalene	100 J	3700 U	AC
	Acenaphthene	87 J	3700 U	AC
	Anthracene	200 J	3700 U	AC

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-01 (5-7)/ DUP-080212	Benzo(a)anthracene	580 J	3700 U	AC
	Benzo(a)pyrene	690 J	710 J	AC
	Benzo(b)fluoranthene	1000 J	840 J	AC
	Benzo(g,h,i)perylene	280 J	470 J	AC
	Benzo(k)fluoranthene	380 J	360 J	AC
	Chrysene	550 J	600 J	AC
	Fluoranthene	1100 J	1200 J	AC
	Indeno(1,2,3-cd)pyrene	260 J	400 J	AC
	Phenanthrene	810 J	800 J	AC
	Pyrene	840 J	1000 J	AC

AC - Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
D. Method blanks		X		X	
E. Equipment blanks					X
Laboratory Control Sample (LCS) %R		X	X		
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate(MSD) %R		X	X		
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X	X		
Dilution Factor		X		X	
Moisture Content					X
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
F. Reconstructed ion chromatograms		X		X	
G. Quantitation Reports		X		X	
H. RT of sample compounds within the established RT windows		X		X	
I. Transcription/calculation errors present				X	
J. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6000/7000 and 9012A/9016. Data were reviewed in accordance with USEPA National Functional Guidelines of July 2002.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010B	Water	180 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to 4°C±2°C.
SW-846 7470	Water	28 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool to 4°C±2°C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. Therefore, sample results greater than the BAL resulted in the removal of the laboratory qualifier (B). No other qualification of the sample results was required.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All CRDL standard recoveries were within control limits.

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analyte present in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
AW-02 (8-10)	Aluminum	215%	195%
AB-03 (8-10)	Aluminum	211%	247%
	Lead	AC	70%
	Potassium	134%	136%
	Zinc	185%	137%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
	Detect	J
MS/MSD percent recovery <30%	Non-detect	R
	Detect	J

Control limit	Sample Result	Qualification
MS/MSD percent recovery >125%	Non-detect	No Action
	Detect	J

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
AW-01 (5-7)/ DUP-080212	Aluminum	5740	5200	9.8 %
	Arsenic	5.5	4.8	13.5 %
	Barium	48.2	47.2	2.0 %
	Beryllium	0.4	0.51	24.1 %
	Cadmium	0.64	0.35	58.5 %
	Calcium	75700	75100	0.7 %
	Chromium	13.1	10.7	20.1 %
	Cobalt	5.8	4.6	23.0 %
	Copper	18.4	18.7	1.6 %
	Iron	16000	12700	22.9 %
	Lead	124	93	28.5 %
	Magnesium	28100	30700	8.8 %
	Manganese	496	341	37.0 %
	Nickel	14.6	14.8	1.3 %
	Potassium	1000	848	16.4 %

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
AW-01 (5-7)/ DUP-080212	Selenium	4.5 U	1.2 J	AC
	Sodium	359	305	16.2 %
	Vanadium	17.8	11.4	43.8 %
	Zinc	168	84.2	66.4 %
	Mercury	0.055	0.074	29.4 %

AC = Acceptable

The analyte zinc associated with samples locations AW-01 (5-7) and DUP-080212 exhibited a field duplicate RPD greater than the control limit. The associated sample results from sample locations for the listed analyte were qualified as estimated.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

All serial dilutions were within control limits, with the exception of the analytes presented in the following table. The sample locations associated with the deviant %D are also presented in the following table.

Sample Locations	Analytes	Serial Dilution (%D)
AW-02 (18-21)	Aluminum	15%
	Barium	15%
	Calcium	17%
	Chromium	12%
	Iron	20%
	Potassium	16%
	Sodium	16%
	Vanadium	11%
	Zinc	14%

The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6000/7000	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP) Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X	X		
C. Equipment/Field Blanks		X	X		
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution		X	X		
Reporting Limit Verification		X		X	
Raw Data		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard		X		X	
ICP Interference Check		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%R Percent recovery
RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Total/Free Cyanide by SW-846 9012A/9016	Water	14 days from collection to analysis	Cooled @ 4°C ± 2; preserved to a pH of greater than 12.
	Soil		Cooled @ 4°C ± 2.

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All analytes associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the analytes listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (J) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analyte	Sample Result	Qualification
AB-03 (8-10) AB-03- (20-22.5) AB-C2 (8-11) AB-C2 (22-24)	Free cyanide	Detected sample results >RL and <BAL	"UB" at detected sample concentration

RL = reporting limit

3. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all initial calibration verification standard recoveries were within control limits.

All calibration standard recoveries were within the control limit.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD analysis exhibited recoveries within the control limit.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-01 (5-7)/ DUP-080212	Cyanide, Total	1.2	0.63 J	AC
	Cyanide, Free	0.42 J	0.49 U	AC

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All LCS recoveries were within control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SW-846 9012A and 9016	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks					X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor					X
Moisture Content		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present				X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference

SAMPLE COMPLIANCE REPORT

Sample Delivery Group (SDG)	Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
					VOC	SVOC	PCB	MET	MISC	
480-23453	8/1/2012	SW846	AB-05 (9.5-10.8)	Soil	No	yes	--	No	yes	VOC – Method Blank MET – MS/MSD %R, Ser Dil., Field dup.
	8/1/2012	SW846	AB-05 (22-25)	Soil	No	yes	--	No	yes	VOC – Method Blank MET – MS/MSD %R, Ser Dil., Field dup.
	8/2/2012	SW846	AB-01 (8-14)	Soil	No	yes	--	No	yes	VOC – Method Blank MET – MS/MSD %R, Ser Dil., Field dup.
	8/2/2012	SW846	AB-01 (20-22)	Soil	No	yes	--	No	yes	VOC – Method Blank MET – MS/MSD %R, Ser Dil., Field dup.
	8/2/2012	SW846	AW-02 (8-10)	Soil	yes	yes	--	No	yes	MET – MS/MSD %R, Ser Dil., Field dup.
	8/2/2012	SW846	AW-02 (18-21)	Soil	No	No	--	No	yes	VOC – MS/MSD RPD SVOC – MS/MSD %R MET – MS/MSD %R, Ser Dil., Field dup.
	8/2/2012	SW846	AW-01 (5-7)	Soil	No	yes	--	No	yes	VOC – Method Blank MET – MS/MSD %R, Ser Dil., Field dup.
	8/2/2012	SW846	AW-01 (20-22.5)	Soil	yes	yes	--	No	yes	MET – MS/MSD %R, Ser Dil., Field dup.
	8/2/2012	SW846	RB-080212	Water	No	yes	--	No	yes	VOC – CCAL %D MET – MS/MSD %R, Ser Dil., Field dup.
	8/3/2012	SW846	AB-04 (10-12)	Soil	yes	yes	--	No	yes	MET – MS/MSD %R, Ser Dil., Field dup.
	8/3/2012	SW846	TRIP BLANK	Water	No	--	--	--	--	VOC – CCAL %D
	8/2/2012	SW846	DUP-080212	Soil	No	yes	--	No	yes	VOC – Method Blank MET – MS/MSD %R, Ser Dil., Field dup.
	8/3/2012	SW846	AB-04 (18-21)	Soil	No	yes	--	No	yes	MET – MS/MSD %R, Ser Dil., Field dup.
	8/3/2012	SW846	AB-02 (8-10)	Soil	No	yes	--	No	yes	MET – MS/MSD %R, Ser Dil., Field dup.
	8/3/2012	SW846	AB-02 (20-22)	Soil	No	yes	--	No	yes	MET – MS/MSD %R, Ser Dil., Field dup.
	8/6/2012	SW846	AB-03 (8-10)	Soil	No	yes	--	No	yes	VOC – CCAL %D MET – MS/MSD %R, Ser Dil., Field dup. MISC – Method Blank

Sample Delivery Group (SDG)	Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
					VOC	SVOC	PCB	MET	MISC	
	8/6/2012	SW846	AB-03- (20-22.5)	Soil	No	yes	--	No	yes	VOC – CCAL %D, Method Blank MET – MS/MSD %R, Ser Dil., Field dup. MISC – Method Blank
	8/6/2012	SW846	AB-C2 (8-11)	Soil	No	yes	--	No	yes	VOC – CCAL %D, Method Blank MET – MS/MSD %R, Ser Dil., Field dup. MISC – Method Blank
	8/6/2012	SW846	AB-C2 (22-24)	Soil	No	yes	--	No	yes	VOC – CCAL %D, Method Blank MET – MS/MSD %R, Ser Dil., Field dup. MISC – Method Blank

1 Samples which are compliant with no added validation qualifiers are listed as "yes". Samples which are non-compliant or which have added qualifiers are listed as "no". A "no" designation does not necessarily indicate that the data have been rejected or are otherwise unusable.

VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE: 

DATE: October 3, 2012

PEER REVIEW: Dennis Capria

DATE: October 5, 2012

CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Temperature on Receipt _____

Drinking Water? Yes☐ No☐

TAL-4124 (1007)

Client	Project Manager	Date	Chain of Custody Number
ARCADIS/National Fuel	Scott Powlin	8/3/12	232364
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page** 1 of 2
295 Woodcliff Drive	315-671-9456		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
Fairport / NY / 14450	Klaus Boyle	Candy Fox	
Project Name and Location (State)	**Carrier/Waybill Number**		
Wilkeson Slip, Buffalo, NY			
Contract/Purchase Order/Quote No.			
B002330			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: TCL VOC (8260B)	TCL SVOC (8270C)	CN (9012A)	Free CN (9014)	Hg (7471A)	TAL Metals (6010B)	Special Instructions/ Conditions of Receipt
AB-05 (9.5-10.8)	8.1.12	1440				X	5						X	X	X	X	X	X	
AB-05 (22-25)	8.1.12	1450				X	5						X	X	X	X	X	X	
AB-01 (8-14)	8/2/12	0840				X	5						X	X	X	X	X	X	
AB-01 (20-22)	8/2/12	0900				X	5						X	X	X	X	X	X	
AW-02 (6-10)	8/2/12	1120				X	5						X	X	X	X	X	X	
AW-02 (18-21)	8/2/12	1130				X	15						X	X	X	X	X	X	MS/MSD
AW-01 (5-7)	8/2/12	1530				X	5						X	X	X	X	X	X	
AW-01 (20-22.5)	8/2/12	1540				X	5						X	X	X	X	X	X	
RB-080212	8/2/12	1640		X			2			1	3	2	X	X	X	X	X	X	
AB-04 (10-12)	8/3/12	0920					5						X	X	X	X	X	X	
TRIP BLANK	—	—		X			2			2			X						only VOA (2)
DUP-080212	8/2/12	—				X	5						X	X	X	X	X	X	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal (Call before disposal!!)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other Standard

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	8/3/12	1500	1. Received By T K Buffalo	8/3/12	1500
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	4. Received By	Date	Time

Comments
Call Scott Powlin before disposing of samples

1.8, 2.8 #2

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes☐ No☐

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client	Project Manager	Date	Chain of Custody Number
ARCADIS/National Fuel	Scott Powlin	8/3/12	232365
Address 295 Woodcliff Drive	**Telephone Number (Area Code)/Fax Number** 315-671-9456	**Lab Number**	**Page** 2 of 2
City Fairport / **State** NY / **Zip Code** 14450	**Site Contact** Klaus Beyrle	**Lab Contact** Cindy Fox	
Project Name and Location (State) Wilkeson Slip Buffalo, NY	**Carrier/Waybill Number**		
Contract/Purchase Order/Quote No. 30023310			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: TCL VOC (8260 w/ TICs)	TCL SVOC (8270 w/ TICs)	CN (9014)	Free CN (9016)	Hg (7471A)	TAL Metals (6010B)
AB-04 (18-21)	8/3/12	0930				X	5						X	X	X	X	X	X
AB-02 (8-10)	8/3/12	~~0900~~ 0900				X	5						X	X	X	X	X	X
AB-02 (20-22)	8/3/12	1210				X	5						X	X	X	X	X	X

Special Instructions/ Conditions of Receipt

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☒ Archive For _____ Months (Call before Disposal!!)
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other standard

QC Requirements (Specify)

	Date	Time
1. Relinquished By	8/4/12	1500
2. Relinquished By		
3. Relinquished By		

	Date	Time
1. Received By TA Buffalo	8/3/12	~~1510~~ 1500
2. Received By		
3. Received By		

Comments
Call Scott Powlin before disposing of Samples

1.8, 2.9, 4.2

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes☐ No☐

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client	Project Manager	Date	Chain of Custody Number
ARCADIS / National Fuel	Scott Poulin	8/7/12	232366
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page** 1 of 1
295 Woodcliff Drive	315-671-9456		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
Fairport / NY / 14450	Klaus Berle	Candy Fox	
Project Name and Location (State)	**Carrier/Waybill Number**		
Wilkeson Slip, Buffalo, NY			
Contract/Purchase Order/Quote No.			
B00123310			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil	Containers & Preservatives: Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	TCL VOC (almost all)	TCL SVOC (OLM04.2)	Cr (6+) (lab)	Free Cn (field)	Hg (7471A)	Tot. Metals (6010B)	Special Instructions/ Conditions of Receipt
AB-03 (8-10)	8/6/12	1050				X	5						X	X	X	X	X	X	
AB-03 (20-22.5)	8/6/12	1100				X	5						X	X	X	X	X	X	
AB-C2 (8-11)	8/6/12	1430				X	5						X	X	X	X	X	X	
AB-C2 (22-24)	8/6/12	1440				X	5						X	X	X	X	X	X	

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Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab (Call before disposal !!) ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other Standard

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	8/7/12	330	1. Received By	8/7/12	13:35
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments
Call Scott Poulin Before disposing of Samples

2.944 3

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample, PINK - Field Copy

08/30/2012

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (9.5-10.8)**

Lab Sample ID: 480-23453-1
Client Matrix: Solid

% Moisture: 20.4

Date Sampled: 08/01/2012 1440
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75363	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2790.D
Dilution:	1.0			Initial Weight/Volume:	5.04 g
Analysis Date:	08/07/2012 0246			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.45	6.2
1,1,2,2-Tetrachloroethane		ND		1.0	6.2
1,1,2-Trichloroethane		ND		0.81	6.2
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.4	6.2
1,1-Dichloroethane		ND		0.76	6.2
1,1-Dichloroethene		ND		0.76	6.2
1,2,4-Trichlorobenzene		ND		0.38	6.2
1,2-Dibromo-3-Chloropropane		ND		3.1	6.2
1,2-Dibromoethane		ND		0.80	6.2
1,2-Dichlorobenzene		ND		0.49	6.2
1,2-Dichloroethane		ND		0.31	6.2
1,2-Dichloropropane		ND		3.1	6.2
1,3-Dichlorobenzene		ND		0.32	6.2
1,4-Dichlorobenzene		ND		0.87	6.2
2-Hexanone		ND		3.1	31
2-Butanone (MEK)		6.9	J	2.3	31
4-Methyl-2-pentanone (MIBK)		ND		2.0	31
Acetone		40	U B	5.2	31
Benzene		ND		0.31	6.2
Bromodichloromethane		ND		0.84	6.2
Bromoform		ND		3.1	6.2
Bromomethane		ND		0.56	6.2
Carbon disulfide		ND		3.1	6.2
Carbon tetrachloride		ND		0.60	6.2
Chlorobenzene		ND		0.82	6.2
Dibromochloromethane		ND		0.80	6.2
Chloroethane		ND		1.4	6.2
Chloroform		ND		0.39	6.2
Chloromethane		ND		0.38	6.2
cis-1,2-Dichloroethene		ND		0.80	6.2
cis-1,3-Dichloropropene		ND		0.90	6.2
Cyclohexane		ND		0.87	6.2
Dichlorodifluoromethane		ND		0.51	6.2
Ethylbenzene		ND		0.43	6.2
Isopropylbenzene		ND		0.94	6.2
Methyl acetate		ND		1.2	6.2
Methyl tert-butyl ether		ND		0.61	6.2
Methylcyclohexane		ND		0.95	6.2
Methylene Chloride		ND		2.9	6.2
Styrene		ND		0.31	6.2
Tetrachloroethene		ND		0.84	6.2
Toluene		ND		0.47	6.2
trans-1,2-Dichloroethene		ND		0.64	6.2
trans-1,3-Dichloropropene		ND		2.7	6.2
Trichloroethene		ND		1.4	6.2
Trichlorofluoromethane		ND		0.59	6.2

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (9.5-10.8)**

Lab Sample ID: 480-23453-1
Client Matrix: Solid

% Moisture: 20.4

Date Sampled: 08/01/2012 1440
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75363	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2790.D
Dilution:	1.0			Initial Weight/Volume:	5.04 g
Analysis Date:	08/07/2012 0246			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.76	6.2
Xylenes, Total		ND		1.0	12

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	91		64 - 126
Toluene-d8 (Surr)	105		71 - 125
4-Bromofluorobenzene (Surr)	102		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (22-25)**

Lab Sample ID: 480-23453-2
Client Matrix: Solid

% Moisture: 17.0

Date Sampled: 08/01/2012 1450
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75363	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2791.D
Dilution:	1.0			Initial Weight/Volume:	5.07 g
Analysis Date:	08/07/2012 0311			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.43	5.9
1,1,2,2-Tetrachloroethane		ND		0.96	5.9
1,1,2-Trichloroethane		ND		0.77	5.9
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.4	5.9
1,1-Dichloroethane		ND		0.72	5.9
1,1-Dichloroethene		ND		0.73	5.9
1,2,4-Trichlorobenzene		ND		0.36	5.9
1,2-Dibromo-3-Chloropropane		ND		3.0	5.9
1,2-Dibromoethane		ND		0.76	5.9
1,2-Dichlorobenzene		ND		0.46	5.9
1,2-Dichloroethane		ND		0.30	5.9
1,2-Dichloropropane		ND		3.0	5.9
1,3-Dichlorobenzene		ND		0.31	5.9
1,4-Dichlorobenzene		ND		0.83	5.9
2-Hexanone		ND		3.0	30
2-Butanone (MEK)		150		2.2	30
4-Methyl-2-pentanone (MIBK)		ND		1.9	30
Acetone		~~12~~ 30 08	~~J B~~	5.0	30
Benzene		ND		0.29	5.9
Bromodichloromethane		ND		0.80	5.9
Bromoform		ND		3.0	5.9
Bromomethane		ND		0.53	5.9
Carbon disulfide		ND		3.0	5.9
Carbon tetrachloride		ND		0.58	5.9
Chlorobenzene		ND		0.78	5.9
Dibromochloromethane		ND		0.76	5.9
Chloroethane		ND		1.3	5.9
Chloroform		ND		0.37	5.9
Chloromethane		ND		0.36	5.9
cis-1,2-Dichloroethene		ND		0.76	5.9
cis-1,3-Dichloropropene		ND		0.86	5.9
Cyclohexane		ND		0.83	5.9
Dichlorodifluoromethane		ND		0.49	5.9
Ethylbenzene		ND		0.41	5.9
Isopropylbenzene		ND		0.90	5.9
Methyl acetate		ND	Y	1.1	5.9
Methyl tert-butyl ether		ND		0.58	5.9
Methylcyclohexane		ND		0.90	5.9
Methylene Chloride		ND		2.7	5.9
Styrene		ND		0.30	5.9
Tetrachloroethene		ND		0.80	5.9
Toluene		ND		0.45	5.9
trans-1,2-Dichloroethene		ND		0.61	5.9
trans-1,3-Dichloropropene		ND		2.6	5.9
Trichloroethene		ND		1.3	5.9
Trichlorofluoromethane		ND		0.56	5.9

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (22-25)**

Lab Sample ID: 480-23453-2
Client Matrix: Solid

% Moisture: 17.0

Date Sampled: 08/01/2012 1450
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75363	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2791.D
Dilution:	1.0			Initial Weight/Volume:	5.07 g
Analysis Date:	08/07/2012 0311			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.72	5.9
Xylenes, Total		ND		1.0	12

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	94		64 - 126
Toluene-d8 (Surr)	103		71 - 125
4-Bromofluorobenzene (Surr)	101		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (8-14)**

Lab Sample ID: 480-23453-3
Client Matrix: Solid

% Moisture: 12.7

Date Sampled: 08/02/2012 0840
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75363	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2792.D
Dilution:	1.0			Initial Weight/Volume:	5.01 g
Analysis Date:	08/07/2012 0336			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.41	5.7
1,1,2,2-Tetrachloroethane		ND		0.93	5.7
1,1,2-Trichloroethane		ND		0.74	5.7
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.3	5.7
1,1-Dichloroethane		ND		0.70	5.7
1,1-Dichloroethene		ND		0.70	5.7
1,2,4-Trichlorobenzene		ND		0.35	5.7
1,2-Dibromo-3-Chloropropane		ND		2.9	5.7
1,2-Dibromoethane		ND		0.73	5.7
1,2-Dichlorobenzene		ND		0.45	5.7
1,2-Dichloroethane		ND		0.29	5.7
1,2-Dichloropropane		ND		2.9	5.7
1,3-Dichlorobenzene		ND		0.29	5.7
1,4-Dichlorobenzene		ND		0.80	5.7
2-Hexanone		ND		2.9	29
2-Butanone (MEK)		ND		2.1	29
4-Methyl-2-pentanone (MIBK)		ND		1.9	29
Acetone		29	B	4.8	29
Benzene		ND		0.28	5.7
Bromodichloromethane		ND		0.77	5.7
Bromoform		ND		2.9	5.7
Bromomethane		ND		0.51	5.7
Carbon disulfide		ND		2.9	5.7
Carbon tetrachloride		ND		0.55	5.7
Chlorobenzene		ND		0.75	5.7
Dibromochloromethane		ND		0.73	5.7
Chloroethane		ND		1.3	5.7
Chloroform		ND		0.35	5.7
Chloromethane		ND		0.35	5.7
cis-1,2-Dichloroethene		ND		0.73	5.7
cis-1,3-Dichloropropene		ND		0.82	5.7
Cyclohexane		11		0.80	5.7
Dichlorodifluoromethane		ND		0.47	5.7
Ethylbenzene		ND		0.39	5.7
Isopropylbenzene		ND		0.86	5.7
Methyl acetate		ND		1.1	5.7
Methyl tert-butyl ether		ND		0.56	5.7
Methylcyclohexane		13		0.87	5.7
Methylene Chloride		ND		2.6	5.7
Styrene		ND		0.29	5.7
Tetrachloroethene		ND		0.77	5.7
Toluene		1.7	J	0.43	5.7
trans-1,2-Dichloroethene		ND		0.59	5.7
trans-1,3-Dichloropropene		ND		2.5	5.7
Trichloroethene		ND		1.3	5.7
Trichlorofluoromethane		ND		0.54	5.7

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (8-14)**

Lab Sample ID: 480-23453-3
Client Matrix: Solid

% Moisture: 12.7

Date Sampled: 08/02/2012 0840
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75363	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2792.D
Dilution:	1.0			Initial Weight/Volume:	5.01 g
Analysis Date:	08/07/2012 0336			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.70	5.7
Xylenes, Total		1.2	J	0.96	11

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	98		64 - 126
Toluene-d8 (Surr)	106		71 - 125
4-Bromofluorobenzene (Surr)	105		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (20-22)**

Lab Sample ID: 480-23453-4
Client Matrix: Solid

% Moisture: 32.9

Date Sampled: 08/02/2012 0900
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2802.D
Dilution:	1.0			Initial Weight/Volume:	0.62 g
Analysis Date:	08/07/2012 1306			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		4.4	60
1,1,2,2-Tetrachloroethane		ND		9.7	60
1,1,2-Trichloroethane		ND		7.8	60
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		14	60
1,1-Dichloroethane		ND		7.3	60
1,1-Dichloroethene		ND		7.4	60
1,2,4-Trichlorobenzene		ND		3.7	60
1,2-Dibromo-3-Chloropropane		ND		30	60
1,2-Dibromoethane		ND		7.7	60
1,2-Dichlorobenzene		ND		4.7	60
1,2-Dichloroethane		ND		3.0	60
1,2-Dichloropropane		ND		30	60
1,3-Dichlorobenzene		ND		3.1	60
1,4-Dichlorobenzene		ND		8.4	60
2-Hexanone		ND		30	300
2-Butanone (MEK)		130	J	22	300
4-Methyl-2-pentanone (MIBK)		ND		20	300
Acetone		390		51	300
Benzene		ND		2.9	60
Bromodichloromethane		ND		8.1	60
Bromoform		ND		30	60
Bromomethane		ND		5.4	60
Carbon disulfide		ND		30	60
Carbon tetrachloride		ND		5.8	60
Chlorobenzene		ND		7.9	60
Dibromochloromethane		ND		7.7	60
Chloroethane		ND		14	60
Chloroform		ND		3.7	60
Chloromethane		ND		3.6	60
cis-1,2-Dichloroethene		ND		7.7	60
cis-1,3-Dichloropropene		ND		8.7	60
Cyclohexane		23	J	8.4	60
Dichlorodifluoromethane		ND		5.0	60
Ethylbenzene		ND		4.1	60
Isopropylbenzene		53	J	9.1	60
Methyl acetate		ND		11	60
Methyl tert-butyl ether		ND		5.9	60
Methylcyclohexane		56	J	9.1	60
Methylene Chloride		ND		28	60
Styrene		ND		3.0	60
Tetrachloroethene		ND		8.1	60
Toluene		ND		4.5	60
trans-1,2-Dichloroethene		ND		6.2	60
trans-1,3-Dichloropropene		ND		26	60
Trichloroethene		ND		13	60
Trichlorofluoromethane		ND		5.7	60

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (20-22)**

Lab Sample ID: 480-23453-4
Client Matrix: Solid

% Moisture: 32.9

Date Sampled: 08/02/2012 0900
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2802.D
Dilution:	1.0			Initial Weight/Volume:	0.62 g
Analysis Date:	08/07/2012 1306			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		7.3	60
Xylenes, Total		~~45~~ 120 UB	~~J~~B	10	120

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	91		64 - 126
Toluene-d8 (Surr)	104		71 - 125
4-Bromofluorobenzene (Surr)	99		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (8-10)**

Lab Sample ID: 480-23453-5
Client Matrix: Solid

% Moisture: 18.8

Date Sampled: 08/02/2012 1120
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2803.D
Dilution:	1.0			Initial Weight/Volume:	4.99 g
Analysis Date:	08/07/2012 1332			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.45	6.2
1,1,2,2-Tetrachloroethane		ND		1.0	6.2
1,1,2-Trichloroethane		ND		0.80	6.2
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.4	6.2
1,1-Dichloroethane		ND		0.75	6.2
1,1-Dichloroethene		ND		0.75	6.2
1,2,4-Trichlorobenzene		ND		0.37	6.2
1,2-Dibromo-3-Chloropropane		ND		3.1	6.2
1,2-Dibromoethane		ND		0.79	6.2
1,2-Dichlorobenzene		ND		0.48	6.2
1,2-Dichloroethane		ND		0.31	6.2
1,2-Dichloropropane		ND		3.1	6.2
1,3-Dichlorobenzene		ND		0.32	6.2
1,4-Dichlorobenzene		ND		0.86	6.2
2-Hexanone		ND		3.1	31
2-Butanone (MEK)		ND		2.3	31
4-Methyl-2-pentanone (MIBK)		ND		2.0	31
Acetone		20	J	5.2	31
Benzene		ND		0.30	6.2
Bromodichloromethane		ND		0.83	6.2
Bromoform		ND		3.1	6.2
Bromomethane		ND		0.55	6.2
Carbon disulfide		ND		3.1	6.2
Carbon tetrachloride		ND		0.60	6.2
Chlorobenzene		ND		0.81	6.2
Dibromochloromethane		ND		0.79	6.2
Chloroethane		ND		1.4	6.2
Chloroform		ND		0.38	6.2
Chloromethane		ND		0.37	6.2
cis-1,2-Dichloroethene		ND		0.79	6.2
cis-1,3-Dichloropropene		ND		0.89	6.2
Cyclohexane		ND		0.86	6.2
Dichlorodifluoromethane		ND		0.51	6.2
Ethylbenzene		ND		0.43	6.2
Isopropylbenzene		ND		0.93	6.2
Methyl acetate		ND		1.1	6.2
Methyl tert-butyl ether		ND		0.61	6.2
Methylcyclohexane		ND		0.94	6.2
Methylene Chloride		ND		2.8	6.2
Styrene		ND		0.31	6.2
Tetrachloroethene		0.89	J	0.83	6.2
Toluene		ND		0.47	6.2
trans-1,2-Dichloroethene		ND		0.64	6.2
trans-1,3-Dichloropropene		ND		2.7	6.2
Trichloroethene		ND		1.4	6.2
Trichlorofluoromethane		ND		0.58	6.2

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (8-10)**

Lab Sample ID: 480-23453-5
Client Matrix: Solid

% Moisture: 18.8

Date Sampled: 08/02/2012 1120
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2803.D
Dilution:	1.0			Initial Weight/Volume:	4.99 g
Analysis Date:	08/07/2012 1332			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.75	6.2
Xylenes, Total		ND		1.0	12

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	99		64 - 126
Toluene-d8 (Surr)	113		71 - 125
4-Bromofluorobenzene (Surr)	106		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (18-21)**

Lab Sample ID: 480-23453-6
Client Matrix: Solid

% Moisture: 38.4

Date Sampled: 08/02/2012 1130
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2804.D
Dilution:	1.0			Initial Weight/Volume:	0.65 g
Analysis Date:	08/07/2012 1357			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		4.5	62
1,1,2,2-Tetrachloroethane		ND		10	62
1,1,2-Trichloroethane		ND		8.1	62
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		14	62
1,1-Dichloroethane		ND		7.6	62
1,1-Dichloroethene		ND		7.6	62
1,2,4-Trichlorobenzene		ND		3.8	62
1,2-Dibromo-3-Chloropropane		ND		31	62
1,2-Dibromoethane		ND		8.0	62
1,2-Dichlorobenzene		ND		4.9	62
1,2-Dichloroethane		ND		3.1	62
1,2-Dichloropropane		ND		31	62
1,3-Dichlorobenzene		ND		3.2	62
1,4-Dichlorobenzene		ND		8.7	62
2-Hexanone		ND		31	310
2-Butanone (MEK)		61	J	23	310
4-Methyl-2-pentanone (MIBK)		ND		20	310
Acetone		230	J	53	310
Benzene		ND		3.1	62
Bromodichloromethane		ND		8.4	62
Bromoform		ND		31	62
Bromomethane		ND		5.6	62
Carbon disulfide		ND		31	62
Carbon tetrachloride		ND		6.0	62
Chlorobenzene		ND		8.2	62
Dibromochloromethane		ND		8.0	62
Chloroethane		ND		14	62
Chloroform		ND		3.9	62
Chloromethane		ND		3.8	62
cis-1,2-Dichloroethene		ND		8.0	62
cis-1,3-Dichloropropene		ND		9.0	62
Cyclohexane		ND		8.7	62
Dichlorodifluoromethane		ND		5.2	62
Ethylbenzene		ND		4.3	62
Isopropylbenzene		24	J	9.4	62
Methyl acetate		ND		12	62
Methyl tert-butyl ether		ND		6.1	62
Methylcyclohexane		16	J	9.5	62
Methylene Chloride		ND		29	62
Styrene		ND		3.1	62
Tetrachloroethene		ND		8.4	62
Toluene		ND		4.7	62
trans-1,2-Dichloroethene		ND		6.4	62
trans-1,3-Dichloropropene		ND		27	62
Trichloroethene		ND		14	62
Trichlorofluoromethane		ND		5.9	62

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (18-21)**

Lab Sample ID: 480-23453-6
Client Matrix: Solid

% Moisture: 38.4

Date Sampled: 08/02/2012 1130
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2804.D
Dilution:	1.0			Initial Weight/Volume:	0.65 g
Analysis Date:	08/07/2012 1357			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND	J	7.6	62
Xylenes, Total		67	J B	10	120

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	88		64 - 126
Toluene-d8 (Surr)	103		71 - 125
4-Bromofluorobenzene (Surr)	98		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-01 (5-7)**

Lab Sample ID: 480-23453-7
Client Matrix: Solid

% Moisture: 12.8

Date Sampled: 08/02/2012 1530
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2807.D
Dilution:	1.0			Initial Weight/Volume:	5.09 g
Analysis Date:	08/07/2012 1513			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.41	5.6
1,1,2,2-Tetrachloroethane		ND		0.91	5.6
1,1,2-Trichloroethane		ND		0.73	5.6
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.3	5.6
1,1-Dichloroethane		ND		0.69	5.6
1,1-Dichloroethene		ND		0.69	5.6
1,2,4-Trichlorobenzene		ND		0.34	5.6
1,2-Dibromo-3-Chloropropane		ND		2.8	5.6
1,2-Dibromoethane		ND		0.72	5.6
1,2-Dichlorobenzene		ND		0.44	5.6
1,2-Dichloroethane		ND		0.28	5.6
1,2-Dichloropropane		ND		2.8	5.6
1,3-Dichlorobenzene		ND		0.29	5.6
1,4-Dichlorobenzene		ND		0.79	5.6
2-Hexanone		ND		2.8	28
2-Butanone (MEK)		ND		2.1	28
4-Methyl-2-pentanone (MIBK)		ND		1.8	28
Acetone		13	J	4.7	28
Benzene		ND		0.28	5.6
Bromodichloromethane		ND		0.75	5.6
Bromoform		ND		2.8	5.6
Bromomethane		ND		0.51	5.6
Carbon disulfide		ND		2.8	5.6
Carbon tetrachloride		ND		0.55	5.6
Chlorobenzene		ND		0.74	5.6
Dibromochloromethane		ND		0.72	5.6
Chloroethane		ND		1.3	5.6
Chloroform		ND		0.35	5.6
Chloromethane		ND		0.34	5.6
cis-1,2-Dichloroethene		ND		0.72	5.6
cis-1,3-Dichloropropene		ND		0.81	5.6
Cyclohexane		2.1	J	0.79	5.6
Dichlorodifluoromethane		ND		0.47	5.6
Ethylbenzene		ND		0.39	5.6
Isopropylbenzene		ND		0.85	5.6
Methyl acetate		ND		1.0	5.6
Methyl tert-butyl ether		ND		0.55	5.6
Methylcyclohexane		2.7	J	0.86	5.6
Methylene Chloride		ND		2.6	5.6
Styrene		ND		0.28	5.6
Tetrachloroethene		ND		0.76	5.6
Toluene		1.7	J	0.43	5.6
trans-1,2-Dichloroethene		ND		0.58	5.6
trans-1,3-Dichloropropene		ND		2.5	5.6
Trichloroethene		ND		1.2	5.6
Trichlorofluoromethane		ND		0.53	5.6

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-01 (5-7)**

Lab Sample ID: 480-23453-7
Client Matrix: Solid

% Moisture: 12.8

Date Sampled: 08/02/2012 1530
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2807.D
Dilution:	1.0			Initial Weight/Volume:	5.09 g
Analysis Date:	08/07/2012 1513			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.69	5.6
Xylenes, Total		~~3.3~~ 11 UB	~~J B~~	0.95	11

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	90		64 - 126
Toluene-d8 (Surr)	101		71 - 125
4-Bromofluorobenzene (Surr)	97		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-01 (20-22.5)**

Lab Sample ID: 480-23453-8
Client Matrix: Solid

% Moisture: 23.6

Date Sampled: 08/02/2012 1540
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2808.D
Dilution:	1.0			Initial Weight/Volume:	5.03 g
Analysis Date:	08/07/2012 1539			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.47	6.5
1,1,2,2-Tetrachloroethane		ND		1.1	6.5
1,1,2-Trichloroethane		ND		0.85	6.5
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.5	6.5
1,1-Dichloroethane		ND		0.79	6.5
1,1-Dichloroethene		ND		0.80	6.5
1,2,4-Trichlorobenzene		ND		0.40	6.5
1,2-Dibromo-3-Chloropropane		ND		3.3	6.5
1,2-Dibromoethane		ND		0.84	6.5
1,2-Dichlorobenzene		ND		0.51	6.5
1,2-Dichloroethane		ND		0.33	6.5
1,2-Dichloropropane		ND		3.3	6.5
1,3-Dichlorobenzene		ND		0.33	6.5
1,4-Dichlorobenzene		ND		0.91	6.5
2-Hexanone		ND		3.3	33
2-Butanone (MEK)		8.4	J	2.4	33
4-Methyl-2-pentanone (MIBK)		ND		2.1	33
Acetone		33		5.5	33
Benzene		2.0	J	0.32	6.5
Bromodichloromethane		ND		0.87	6.5
Bromoform		ND		3.3	6.5
Bromomethane		ND		0.59	6.5
Carbon disulfide		ND		3.3	6.5
Carbon tetrachloride		ND		0.63	6.5
Chlorobenzene		ND		0.86	6.5
Dibromochloromethane		ND		0.83	6.5
Chloroethane		ND		1.5	6.5
Chloroform		ND		0.40	6.5
Chloromethane		ND		0.39	6.5
cis-1,2-Dichloroethene		ND		0.83	6.5
cis-1,3-Dichloropropene		ND		0.94	6.5
Cyclohexane		0.93	J	0.91	6.5
Dichlorodifluoromethane		ND		0.54	6.5
Ethylbenzene		ND		0.45	6.5
Isopropylbenzene		ND		0.98	6.5
Methyl acetate		ND		1.2	6.5
Methyl tert-butyl ether		ND		0.64	6.5
Methylcyclohexane		ND		0.99	6.5
Methylene Chloride		ND		3.0	6.5
Styrene		ND		0.33	6.5
Tetrachloroethene		ND		0.87	6.5
Toluene		0.68	J	0.49	6.5
trans-1,2-Dichloroethene		ND		0.67	6.5
trans-1,3-Dichloropropene		ND		2.9	6.5
Trichloroethene		ND		1.4	6.5
Trichlorofluoromethane		ND		0.62	6.5

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-01 (20-22.5)**

Lab Sample ID: 480-23453-8
Client Matrix: Solid

% Moisture: 23.6

Date Sampled: 08/02/2012 1540
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2808.D
Dilution:	1.0			Initial Weight/Volume:	5.03 g
Analysis Date:	08/07/2012 1539			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.79	6.5
Xylenes, Total		ND		1.1	13

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	99		64 - 126
Toluene-d8 (Surr)	111		71 - 125
4-Bromofluorobenzene (Surr)	106		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: RB-080212

Lab Sample ID: 480-23453-9
Client Matrix: Water

Date Sampled: 08/02/2012 1640
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-76450	Instrument ID:	HP5973P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P2975.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/14/2012 1434			Final Weight/Volume:	5 mL
Prep Date:	08/14/2012 1434				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		0.82	1.0
1,1,2,2-Tetrachloroethane	ND		0.21	1.0
1,1,2-Trichloroethane	ND		0.23	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.31	1.0
1,1-Dichloroethane	ND		0.38	1.0
1,1-Dichloroethene	ND		0.29	1.0
1,2,4-Trichlorobenzene	ND		0.41	1.0
1,2-Dibromo-3-Chloropropane	ND		0.39	1.0
1,2-Dibromoethane	ND		0.73	1.0
1,2-Dichlorobenzene	ND		0.79	1.0
1,2-Dichloroethane	ND		0.21	1.0
1,2-Dichloropropane	ND		0.72	1.0
1,3-Dichlorobenzene	ND		0.78	1.0
1,4-Dichlorobenzene	ND		0.84	1.0
2-Hexanone	ND		1.2	5.0
2-Butanone (MEK)	ND		1.3	10
4-Methyl-2-pentanone (MIBK)	ND		2.1	5.0
Acetone	ND		3.0	10
Benzene	ND		0.41	1.0
Bromodichloromethane	ND		0.39	1.0
Bromoform	ND		0.26	1.0
Bromomethane	ND	J	0.69	1.0
Carbon disulfide	ND		0.19	1.0
Carbon tetrachloride	ND		0.27	1.0
Chlorobenzene	ND		0.75	1.0
Dibromochloromethane	ND		0.32	1.0
Chloroethane	ND	J	0.32	1.0
Chloroform	ND		0.34	1.0
Chloromethane	ND		0.35	1.0
cis-1,2-Dichloroethene	ND		0.81	1.0
cis-1,3-Dichloropropene	ND		0.36	1.0
Cyclohexane	ND		0.18	1.0
Dichlorodifluoromethane	ND	J	0.68	1.0
Ethylbenzene	ND		0.74	1.0
Isopropylbenzene	ND		0.79	1.0
Methyl acetate	ND		0.50	1.0
Methyl tert-butyl ether	ND		0.16	1.0
Methylcyclohexane	ND		0.16	1.0
Methylene Chloride	ND		0.44	1.0
Styrene	ND		0.73	1.0
Tetrachloroethene	ND		0.36	1.0
Toluene	ND		0.51	1.0
trans-1,2-Dichloroethene	ND		0.90	1.0
trans-1,3-Dichloropropene	ND		0.37	1.0
Trichloroethene	ND		0.46	1.0
Trichlorofluoromethane	ND	J	0.88	1.0

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **RB-080212**

Lab Sample ID: 480-23453-9
Client Matrix: Water

Date Sampled: 08/02/2012 1640
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-76450	Instrument ID:	HP5973P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P2975.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/14/2012 1434			Final Weight/Volume:	5 mL
Prep Date:	08/14/2012 1434				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		0.90	1.0
Xylenes, Total	ND		0.66	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	79		66 - 137
Toluene-d8 (Surr)	95		71 - 126
4-Bromofluorobenzene (Surr)	99		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (10-12)**

Lab Sample ID: 480-23453-10
Client Matrix: Solid

% Moisture: 20.0

Date Sampled: 08/03/2012 0920
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2809.D
Dilution:	1.0			Initial Weight/Volume:	0.59 g
Analysis Date:	08/07/2012 1604			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		3.8	53
1,1,2,2-Tetrachloroethane		ND		8.6	53
1,1,2-Trichloroethane		ND		6.9	53
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		12	53
1,1-Dichloroethane		ND		6.5	53
1,1-Dichloroethene		ND		6.5	53
1,2,4-Trichlorobenzene		ND		3.2	53
1,2-Dibromo-3-Chloropropane		ND		26	53
1,2-Dibromoethane		ND		6.8	53
1,2-Dichlorobenzene		ND		4.1	53
1,2-Dichloroethane		ND		2.7	53
1,2-Dichloropropane		ND		26	53
1,3-Dichlorobenzene		ND		2.7	53
1,4-Dichlorobenzene		ND		7.4	53
2-Hexanone		ND		26	260
2-Butanone (MEK)		ND		19	260
4-Methyl-2-pentanone (MIBK)		ND		17	260
Acetone		93	J	45	260
Benzene		ND		2.6	53
Bromodichloromethane		ND		7.1	53
Bromoform		ND		26	53
Bromomethane		ND		4.8	53
Carbon disulfide		ND		26	53
Carbon tetrachloride		ND		5.1	53
Chlorobenzene		ND		7.0	53
Dibromochloromethane		ND		6.8	53
Chloroethane		ND		12	53
Chloroform		ND		3.3	53
Chloromethane		ND		3.2	53
cis-1,2-Dichloroethene		ND		6.8	53
cis-1,3-Dichloropropene		ND		7.6	53
Cyclohexane		ND		7.4	53
Dichlorodifluoromethane		ND		4.4	53
Ethylbenzene		ND		3.7	53
Isopropylbenzene		ND		8.0	53
Methyl acetate		ND		9.8	53
Methyl tert-butyl ether		ND		5.2	53
Methylcyclohexane		ND		8.0	53
Methylene Chloride		ND		24	53
Styrene		ND		2.6	53
Tetrachloroethene		ND		7.1	53
Toluene		ND		4.0	53
trans-1,2-Dichloroethene		ND		5.5	53
trans-1,3-Dichloropropene		ND		23	53
Trichloroethene		ND		12	53
Trichlorofluoromethane		ND		5.0	53

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (10-12)**

Lab Sample ID: 480-23453-10
Client Matrix: Solid

% Moisture: 20.0

Date Sampled: 08/03/2012 0920
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2809.D
Dilution:	1.0			Initial Weight/Volume:	0.59 g
Analysis Date:	08/07/2012 1604			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		6.5	53
Xylenes, Total		ND		8.9	110

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	91		64 - 126
Toluene-d8 (Surr)	106		71 - 125
4-Bromofluorobenzene (Surr)	100		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **TRIP BLANK**

Lab Sample ID: 480-23453-11
Client Matrix: Water

Date Sampled: 08/03/2012 0000
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-76450	Instrument ID:	HP5973P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P2976.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/14/2012 1459			Final Weight/Volume:	5 mL
Prep Date:	08/14/2012 1459				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		0.82	1.0
1,1,2,2-Tetrachloroethane	ND		0.21	1.0
1,1,2-Trichloroethane	ND		0.23	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.31	1.0
1,1-Dichloroethane	ND		0.38	1.0
1,1-Dichloroethene	ND		0.29	1.0
1,2,4-Trichlorobenzene	ND		0.41	1.0
1,2-Dibromo-3-Chloropropane	ND		0.39	1.0
1,2-Dibromoethane	ND		0.73	1.0
1,2-Dichlorobenzene	ND		0.79	1.0
1,2-Dichloroethane	ND		0.21	1.0
1,2-Dichloropropane	ND		0.72	1.0
1,3-Dichlorobenzene	ND		0.78	1.0
1,4-Dichlorobenzene	ND		0.84	1.0
2-Hexanone	ND		1.2	5.0
2-Butanone (MEK)	ND		1.3	10
4-Methyl-2-pentanone (MIBK)	ND		2.1	5.0
Acetone	ND		3.0	10
Benzene	ND		0.41	1.0
Bromodichloromethane	ND		0.39	1.0
Bromoform	ND		0.26	1.0
Bromomethane	ND	J	0.69	1.0
Carbon disulfide	ND		0.19	1.0
Carbon tetrachloride	ND		0.27	1.0
Chlorobenzene	ND		0.75	1.0
Dibromochloromethane	ND		0.32	1.0
Chloroethane	ND	J	0.32	1.0
Chloroform	ND		0.34	1.0
Chloromethane	ND		0.35	1.0
cis-1,2-Dichloroethene	ND		0.81	1.0
cis-1,3-Dichloropropene	ND		0.36	1.0
Cyclohexane	ND		0.18	1.0
Dichlorodifluoromethane	ND	J	0.68	1.0
Ethylbenzene	ND		0.74	1.0
Isopropylbenzene	ND		0.79	1.0
Methyl acetate	ND		0.50	1.0
Methyl tert-butyl ether	ND		0.16	1.0
Methylcyclohexane	ND		0.16	1.0
Methylene Chloride	ND		0.44	1.0
Styrene	ND		0.73	1.0
Tetrachloroethene	ND		0.36	1.0
Toluene	ND		0.51	1.0
trans-1,2-Dichloroethene	ND		0.90	1.0
trans-1,3-Dichloropropene	ND		0.37	1.0
Trichloroethene	ND		0.46	1.0
Trichlorofluoromethane	ND	J	0.88	1.0

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **TRIP BLANK**

Lab Sample ID: 480-23453-11
Client Matrix: Water

Date Sampled: 08/03/2012 0000
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-76450	Instrument ID:	HP5973P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P2976.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/14/2012 1459			Final Weight/Volume:	5 mL
Prep Date:	08/14/2012 1459				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		0.90	1.0
Xylenes, Total	ND		0.66	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	81		66 - 137
Toluene-d8 (Surr)	95		71 - 126
4-Bromofluorobenzene (Surr)	100		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: DUP-080212

Lab Sample ID: 480-23453-12
Client Matrix: Solid

% Moisture: 8.1

Date Sampled: 08/02/2012 0000
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2810.D
Dilution:	1.0			Initial Weight/Volume:	5.02 g
Analysis Date:	08/07/2012 1630			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.39	5.4
1,1,2,2-Tetrachloroethane		ND		0.88	5.4
1,1,2-Trichloroethane		ND		0.70	5.4
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.2	5.4
1,1-Dichloroethane		ND		0.66	5.4
1,1-Dichloroethene		ND		0.66	5.4
1,2,4-Trichlorobenzene		ND		0.33	5.4
1,2-Dibromo-3-Chloropropane		ND		2.7	5.4
1,2-Dibromoethane		ND		0.70	5.4
1,2-Dichlorobenzene		ND		0.42	5.4
1,2-Dichloroethane		ND		0.27	5.4
1,2-Dichloropropane		ND		2.7	5.4
1,3-Dichlorobenzene		ND		0.28	5.4
1,4-Dichlorobenzene		ND		0.76	5.4
2-Hexanone		ND		2.7	27
2-Butanone (MEK)		ND		2.0	27
4-Methyl-2-pentanone (MIBK)		ND		1.8	27
Acetone		14	J	4.6	27
Benzene		ND		0.27	5.4
Bromodichloromethane		ND		0.73	5.4
Bromoform		ND		2.7	5.4
Bromomethane		ND		0.49	5.4
Carbon disulfide		ND		2.7	5.4
Carbon tetrachloride		ND		0.52	5.4
Chlorobenzene		ND		0.71	5.4
Dibromochloromethane		ND		0.69	5.4
Chloroethane		ND		1.2	5.4
Chloroform		ND		0.33	5.4
Chloromethane		ND		0.33	5.4
cis-1,2-Dichloroethene		ND		0.69	5.4
cis-1,3-Dichloropropene		ND		0.78	5.4
Cyclohexane		1.8	J	0.76	5.4
Dichlorodifluoromethane		ND		0.45	5.4
Ethylbenzene		ND		0.37	5.4
Isopropylbenzene		ND		0.82	5.4
Methyl acetate		ND		1.0	5.4
Methyl tert-butyl ether		ND		0.53	5.4
Methylcyclohexane		2.0	J	0.82	5.4
Methylene Chloride		ND		2.5	5.4
Styrene		ND		0.27	5.4
Tetrachloroethene		ND		0.73	5.4
Toluene		2.2	J	0.41	5.4
trans-1,2-Dichloroethene		ND		0.56	5.4
trans-1,3-Dichloropropene		ND		2.4	5.4
Trichloroethene		ND		1.2	5.4
Trichlorofluoromethane		ND		0.51	5.4

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **DUP-080212**

Lab Sample ID: 480-23453-12
Client Matrix: Solid

% Moisture: 8.1

Date Sampled: 08/02/2012 0000
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2810.D
Dilution:	1.0			Initial Weight/Volume:	5.02 g
Analysis Date:	08/07/2012 1630			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.66	5.4
Xylenes, Total		~~2.6~~ 11 UB	~~J B~~	0.91	11

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	95		64 - 126
Toluene-d8 (Surr)	106		71 - 125
4-Bromofluorobenzene (Surr)	102		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (18-21)**

Lab Sample ID: 480-23453-13
Client Matrix: Solid

% Moisture: 16.0

Date Sampled: 08/03/2012 0930
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2811.D
Dilution:	1.0			Initial Weight/Volume:	5.1 g
Analysis Date:	08/07/2012 1655			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.42	5.8
1,1,2,2-Tetrachloroethane		ND		0.95	5.8
1,1,2-Trichloroethane		ND		0.76	5.8
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.3	5.8
1,1-Dichloroethane		ND		0.71	5.8
1,1-Dichloroethene		ND		0.71	5.8
1,2,4-Trichlorobenzene		ND		0.35	5.8
1,2-Dibromo-3-Chloropropane		ND		2.9	5.8
1,2-Dibromoethane		ND		0.75	5.8
1,2-Dichlorobenzene		ND		0.46	5.8
1,2-Dichloroethane		ND		0.29	5.8
1,2-Dichloropropane		ND		2.9	5.8
1,3-Dichlorobenzene		ND		0.30	5.8
1,4-Dichlorobenzene		ND		0.82	5.8
2-Hexanone		ND		2.9	29
2-Butanone (MEK)		ND		2.1	29
4-Methyl-2-pentanone (MIBK)		ND		1.9	29
Acetone		9.5	J	4.9	29
Benzene		1.1	J	0.29	5.8
Bromodichloromethane		ND		0.78	5.8
Bromoform		ND		2.9	5.8
Bromomethane		ND		0.53	5.8
Carbon disulfide		ND		2.9	5.8
Carbon tetrachloride		ND		0.56	5.8
Chlorobenzene		ND		0.77	5.8
Dibromochloromethane		ND		0.75	5.8
Chloroethane		ND		1.3	5.8
Chloroform		ND		0.36	5.8
Chloromethane		ND		0.35	5.8
cis-1,2-Dichloroethene		ND		0.75	5.8
cis-1,3-Dichloropropene		ND		0.84	5.8
Cyclohexane		ND		0.82	5.8
Dichlorodifluoromethane		ND		0.48	5.8
Ethylbenzene		ND		0.40	5.8
Isopropylbenzene		ND		0.88	5.8
Methyl acetate		ND		1.1	5.8
Methyl tert-butyl ether		ND		0.57	5.8
Methylcyclohexane		ND		0.89	5.8
Methylene Chloride		ND		2.7	5.8
Styrene		ND		0.29	5.8
Tetrachloroethene		ND		0.78	5.8
Toluene		3.6	J	0.44	5.8
trans-1,2-Dichloroethene		ND		0.60	5.8
trans-1,3-Dichloropropene		ND		2.6	5.8
Trichloroethene		ND		1.3	5.8
Trichlorofluoromethane		ND		0.55	5.8

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (18-21)**

Lab Sample ID: 480-23453-13
Client Matrix: Solid

% Moisture: 16.0

Date Sampled: 08/03/2012 0930
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2811.D
Dilution:	1.0			Initial Weight/Volume:	5.1 g
Analysis Date:	08/07/2012 1655			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.71	5.8
Xylenes, Total		ND		0.98	12

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	89		64 - 126
Toluene-d8 (Surr)	103		71 - 125
4-Bromofluorobenzene (Surr)	98		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (8-10)**

Lab Sample ID: 480-23453-14
Client Matrix: Solid

% Moisture: 17.4

Date Sampled: 08/03/2012 1200
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2812.D
Dilution:	1.0			Initial Weight/Volume:	5.12 g
Analysis Date:	08/07/2012 1721			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.43	5.9
1,1,2,2-Tetrachloroethane		ND		0.96	5.9
1,1,2-Trichloroethane		ND		0.77	5.9
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.3	5.9
1,1-Dichloroethane		ND		0.72	5.9
1,1-Dichloroethene		ND		0.72	5.9
1,2,4-Trichlorobenzene		ND		0.36	5.9
1,2-Dibromo-3-Chloropropane		ND		3.0	5.9
1,2-Dibromoethane		ND		0.76	5.9
1,2-Dichlorobenzene		ND		0.46	5.9
1,2-Dichloroethane		ND		0.30	5.9
1,2-Dichloropropane		ND		3.0	5.9
1,3-Dichlorobenzene		ND		0.30	5.9
1,4-Dichlorobenzene		ND		0.83	5.9
2-Hexanone		ND		3.0	30
2-Butanone (MEK)		ND		2.2	30
4-Methyl-2-pentanone (MIBK)		ND		1.9	30
Acetone		11	J	5.0	30
Benzene		ND		0.29	5.9
Bromodichloromethane		ND		0.79	5.9
Bromoform		ND		3.0	5.9
Bromomethane		ND		0.53	5.9
Carbon disulfide		ND		3.0	5.9
Carbon tetrachloride		ND		0.57	5.9
Chlorobenzene		ND		0.78	5.9
Dibromochloromethane		ND		0.76	5.9
Chloroethane		ND		1.3	5.9
Chloroform		ND		0.37	5.9
Chloromethane		ND		0.36	5.9
cis-1,2-Dichloroethene		ND		0.76	5.9
cis-1,3-Dichloropropene		ND		0.85	5.9
Cyclohexane		1.0	J	0.83	5.9
Dichlorodifluoromethane		ND		0.49	5.9
Ethylbenzene		ND		0.41	5.9
Isopropylbenzene		ND		0.89	5.9
Methyl acetate		ND		1.1	5.9
Methyl tert-butyl ether		ND		0.58	5.9
Methylcyclohexane		2.0	J	0.90	5.9
Methylene Chloride		ND		2.7	5.9
Styrene		ND		0.30	5.9
Tetrachloroethene		ND		0.79	5.9
Toluene		ND		0.45	5.9
trans-1,2-Dichloroethene		ND		0.61	5.9
trans-1,3-Dichloropropene		ND		2.6	5.9
Trichloroethene		ND		1.3	5.9
Trichlorofluoromethane		ND		0.56	5.9

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (8-10)**

Lab Sample ID: 480-23453-14
Client Matrix: Solid % Moisture: 17.4

Date Sampled: 08/03/2012 1200
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2812.D
Dilution:	1.0			Initial Weight/Volume:	5.12 g
Analysis Date:	08/07/2012 1721			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.72	5.9
Xylenes, Total		ND		0.99	12

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	93		64 - 126
Toluene-d8 (Surr)	113		71 - 125
4-Bromofluorobenzene (Surr)	106		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (20-22)**

Lab Sample ID: 480-23453-15
Client Matrix: Solid

% Moisture: 22.2

Date Sampled: 08/03/2012 1210
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2813.D
Dilution:	1.0			Initial Weight/Volume:	5.13 g
Analysis Date:	08/07/2012 1747			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.45	6.3
1,1,2,2-Tetrachloroethane		ND		1.0	6.3
1,1,2-Trichloroethane		ND		0.81	6.3
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.4	6.3
1,1-Dichloroethane		ND		0.76	6.3
1,1-Dichloroethene		ND		0.77	6.3
1,2,4-Trichlorobenzene		ND		0.38	6.3
1,2-Dibromo-3-Chloropropane		ND		3.1	6.3
1,2-Dibromoethane		ND		0.80	6.3
1,2-Dichlorobenzene		ND		0.49	6.3
1,2-Dichloroethane		ND		0.31	6.3
1,2-Dichloropropane		ND		3.1	6.3
1,3-Dichlorobenzene		ND		0.32	6.3
1,4-Dichlorobenzene		ND		0.88	6.3
2-Hexanone		ND		3.1	31
2-Butanone (MEK)		ND		2.3	31
4-Methyl-2-pentanone (MIBK)		ND		2.1	31
Acetone		19	J	5.3	31
Benzene		ND		0.31	6.3
Bromodichloromethane		ND		0.84	6.3
Bromoform		ND		3.1	6.3
Bromomethane		ND		0.56	6.3
Carbon disulfide		ND		3.1	6.3
Carbon tetrachloride		ND		0.61	6.3
Chlorobenzene		ND		0.83	6.3
Dibromochloromethane		ND		0.80	6.3
Chloroethane		ND		1.4	6.3
Chloroform		ND		0.39	6.3
Chloromethane		ND		0.38	6.3
cis-1,2-Dichloroethene		ND		0.80	6.3
cis-1,3-Dichloropropene		ND		0.90	6.3
Cyclohexane		ND		0.88	6.3
Dichlorodifluoromethane		ND		0.52	6.3
Ethylbenzene		ND		0.43	6.3
Isopropylbenzene		ND		0.95	6.3
Methyl acetate		ND		1.2	6.3
Methyl tert-butyl ether		ND		0.62	6.3
Methylcyclohexane		ND		0.95	6.3
Methylene Chloride		ND		2.9	6.3
Styrene		ND		0.31	6.3
Tetrachloroethene		ND		0.84	6.3
Toluene		6.2	J	0.47	6.3
trans-1,2-Dichloroethene		ND		0.65	6.3
trans-1,3-Dichloropropene		ND		2.8	6.3
Trichloroethene		ND		1.4	6.3
Trichlorofluoromethane		ND		0.59	6.3

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (20-22)**

Lab Sample ID: 480-23453-15
Client Matrix: Solid

% Moisture: 22.2

Date Sampled: 08/03/2012 1210
Date Received: 08/03/2012 1500

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75464	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75186	Lab File ID:	P2813.D
Dilution:	1.0			Initial Weight/Volume:	5.13 g
Analysis Date:	08/07/2012 1747			Final Weight/Volume:	5 mL
Prep Date:	08/05/2012 2325				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.76	6.3
Xylenes, Total		ND		1.1	13

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	91		64 - 126
Toluene-d8 (Surr)	104		71 - 125
4-Bromofluorobenzene (Surr)	99		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-03 (8-10)**

Lab Sample ID: 480-23564-1
Client Matrix: Solid

% Moisture: 6.8

Date Sampled: 08/06/2012 1050
Date Received: 08/07/2012 1330

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75796	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75790	Lab File ID:	P2874.D
Dilution:	1.0			Initial Weight/Volume:	5.12 g
Analysis Date:	08/09/2012 0330			Final Weight/Volume:	5 mL
Prep Date:	08/08/2012 2229				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.38	5.2
1,1,2,2-Tetrachloroethane		ND		0.85	5.2
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.2	5.2
1,1,2-Trichloroethane		ND		0.68	5.2
1,1-Dichloroethane		ND		0.64	5.2
1,1-Dichloroethene		ND		0.64	5.2
1,2,4-Trichlorobenzene		2.2	J	0.32	5.2
1,2-Dibromo-3-Chloropropane		ND		2.6	5.2
1,2-Dibromoethane		ND		0.67	5.2
1,2-Dichlorobenzene		ND		0.41	5.2
1,2-Dichloroethane		ND		0.26	5.2
1,2-Dichloropropane		ND		2.6	5.2
1,3-Dichlorobenzene		ND		0.27	5.2
1,4-Dichlorobenzene		1.5	J	0.73	5.2
2-Butanone (MEK)		ND		1.9	26
2-Hexanone		ND		2.6	26
4-Methyl-2-pentanone (MIBK)		2.6	J	1.7	26
Acetone		11	J	4.4	26
Benzene		ND		0.26	5.2
Bromodichloromethane		ND		0.70	5.2
Bromoform		ND		2.6	5.2
Bromomethane		ND J		0.47	5.2
Carbon disulfide		ND		2.6	5.2
Carbon tetrachloride		ND		0.51	5.2
Chlorobenzene		ND		0.69	5.2
Chloroethane		ND J		1.2	5.2
Chloroform		ND		0.32	5.2
Chloromethane		ND		0.32	5.2
cis-1,2-Dichloroethene		ND		0.67	5.2
cis-1,3-Dichloropropene		ND		0.75	5.2
Cyclohexane		ND		0.73	5.2
Dibromochloromethane		ND		0.67	5.2
Dichlorodifluoromethane		ND J		0.43	5.2
Ethylbenzene		1.5	J	0.36	5.2
Isopropylbenzene		ND		0.79	5.2
Methyl acetate		ND		0.97	5.2
Methyl tert-butyl ether		ND		0.51	5.2
Methylcyclohexane		ND		0.80	5.2
Methylene Chloride		ND		2.4	5.2
Styrene		ND		0.26	5.2
Tetrachloroethene		0.72	J	0.70	5.2
Toluene		1.2	J	0.40	5.2
trans-1,2-Dichloroethene		ND		0.54	5.2
trans-1,3-Dichloropropene		ND		2.3	5.2
Trichloroethene		ND		1.2	5.2
Trichlorofluoromethane		ND J		0.50	5.2

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-03 (8-10)**

Lab Sample ID: 480-23564-1
Client Matrix: Solid

% Moisture: 6.8

Date Sampled: 08/06/2012 1050
Date Received: 08/07/2012 1330

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75796	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75790	Lab File ID:	P2874.D
Dilution:	1.0			Initial Weight/Volume:	5.12 g
Analysis Date:	08/09/2012 0330			Final Weight/Volume:	5 mL
Prep Date:	08/08/2012 2229				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.64	5.2
Xylenes, Total		8.3	J ~~B~~	0.88	10

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	90		64 - 126
4-Bromofluorobenzene (Surr)	122		72 - 126
Toluene-d8 (Surr)	120		71 - 125

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: AB-03- (20-22.5)

Lab Sample ID: 480-23564-2
Client Matrix: Solid

% Moisture: 18.9

Date Sampled: 08/06/2012 1100
Date Received: 08/07/2012 1330

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75796	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75790	Lab File ID:	P2875.D
Dilution:	1.0			Initial Weight/Volume:	5.03 g
Analysis Date:	08/09/2012 0355			Final Weight/Volume:	5 mL
Prep Date:	08/08/2012 2229				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.44	6.1
1,1,2,2-Tetrachloroethane		ND		0.99	6.1
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.4	6.1
1,1,2-Trichloroethane		ND		0.80	6.1
1,1-Dichloroethane		ND		0.75	6.1
1,1-Dichloroethene		ND		0.75	6.1
1,2,4-Trichlorobenzene		ND		0.37	6.1
1,2-Dibromo-3-Chloropropane		ND		3.1	6.1
1,2-Dibromoethane		ND		0.79	6.1
1,2-Dichlorobenzene		ND		0.48	6.1
1,2-Dichloroethane		ND		0.31	6.1
1,2-Dichloropropane		ND		3.1	6.1
1,3-Dichlorobenzene		ND		0.31	6.1
1,4-Dichlorobenzene		ND		0.86	6.1
2-Butanone (MEK)		23	J	2.2	31
2-Hexanone		ND		3.1	31
4-Methyl-2-pentanone (MIBK)		ND		2.0	31
Acetone		15	J	5.2	31
Benzene		ND		0.30	6.1
Bromodichloromethane		ND		0.82	6.1
Bromoform		ND		3.1	6.1
Bromomethane		ND J		0.55	6.1
Carbon disulfide		ND		3.1	6.1
Carbon tetrachloride		ND		0.59	6.1
Chlorobenzene		ND		0.81	6.1
Chloroethane		ND J		1.4	6.1
Chloroform		ND		0.38	6.1
Chloromethane		ND		0.37	6.1
cis-1,2-Dichloroethene		ND		0.78	6.1
cis-1,3-Dichloropropene		ND		0.88	6.1
Cyclohexane		ND		0.86	6.1
Dibromochloromethane		ND		0.78	6.1
Dichlorodifluoromethane		ND J		0.51	6.1
Ethylbenzene		ND		0.42	6.1
Isopropylbenzene		ND		0.92	6.1
Methyl acetate		4.9	J	1.1	6.1
Methyl tert-butyl ether		ND		0.60	6.1
Methylcyclohexane		ND		0.93	6.1
Methylene Chloride		ND		2.8	6.1
Styrene		ND		0.31	6.1
Tetrachloroethene		ND		0.82	6.1
Toluene		ND		0.46	6.1
trans-1,2-Dichloroethene		ND		0.63	6.1
trans-1,3-Dichloropropene		ND		2.7	6.1
Trichloroethene		ND		1.3	6.1
Trichlorofluoromethane		ND J		0.58	6.1

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-03- (20-22.5)**

Lab Sample ID: 480-23564-2
Client Matrix: Solid

% Moisture: 18.9

Date Sampled: 08/06/2012 1100
Date Received: 08/07/2012 1330

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75796	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75790	Lab File ID:	P2875.D
Dilution:	1.0			Initial Weight/Volume:	5.03 g
Analysis Date:	08/09/2012 0355			Final Weight/Volume:	5 mL
Prep Date:	08/08/2012 2229				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.75	6.1
Xylenes, Total		~~2.3~~ 12 ug	~~J B~~	1.0	12

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	84		64 - 126
4-Bromofluorobenzene (Surr)	107		72 - 126
Toluene-d8 (Surr)	104		71 - 125

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (8-11)**

Lab Sample ID: 480-23564-3
Client Matrix: Solid

% Moisture: 21.8

Date Sampled: 08/06/2012 1430
Date Received: 08/07/2012 1330

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75796	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75790	Lab File ID:	P2876.D
Dilution:	1.0			Initial Weight/Volume:	5.08 g
Analysis Date:	08/09/2012 0421			Final Weight/Volume:	5 mL
Prep Date:	08/08/2012 2229				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.46	6.3
1,1,2,2-Tetrachloroethane		ND		1.0	6.3
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.4	6.3
1,1,2-Trichloroethane		ND		0.82	6.3
1,1-Dichloroethane		ND		0.77	6.3
1,1-Dichloroethene		ND		0.77	6.3
1,2,4-Trichlorobenzene		ND		0.38	6.3
1,2-Dibromo-3-Chloropropane		ND		3.1	6.3
1,2-Dibromoethane		ND		0.81	6.3
1,2-Dichlorobenzene		ND		0.49	6.3
1,2-Dichloroethane		ND		0.32	6.3
1,2-Dichloropropane		ND		3.1	6.3
1,3-Dichlorobenzene		ND		0.32	6.3
1,4-Dichlorobenzene		ND		0.88	6.3
2-Butanone (MEK)		16	J	2.3	31
2-Hexanone		ND		3.1	31
4-Methyl-2-pentanone (MIBK)		ND		2.1	31
Acetone		39		5.3	31
Benzene		ND		0.31	6.3
Bromodichloromethane		ND		0.84	6.3
Bromoform		ND		3.1	6.3
Bromomethane		ND	J	0.57	6.3
Carbon disulfide		ND		3.1	6.3
Carbon tetrachloride		ND		0.61	6.3
Chlorobenzene		ND		0.83	6.3
Chloroethane		ND	J	1.4	6.3
Chloroform		ND		0.39	6.3
Chloromethane		ND		0.38	6.3
cis-1,2-Dichloroethene		ND		0.81	6.3
cis-1,3-Dichloropropene		ND		0.91	6.3
Cyclohexane		ND		0.88	6.3
Dibromochloromethane		ND		0.81	6.3
Dichlorodifluoromethane		ND	J	0.52	6.3
Ethylbenzene		ND		0.43	6.3
Isopropylbenzene		ND		0.95	6.3
Methyl acetate		ND		1.2	6.3
Methyl tert-butyl ether		ND		0.62	6.3
Methylcyclohexane		ND		0.96	6.3
Methylene Chloride		ND		2.9	6.3
Styrene		ND		0.31	6.3
Tetrachloroethene		ND		0.85	6.3
Toluene		ND		0.48	6.3
trans-1,2-Dichloroethene		ND		0.65	6.3
trans-1,3-Dichloropropene		ND		2.8	6.3
Trichloroethene		ND		1.4	6.3
Trichlorofluoromethane		ND	J	0.60	6.3

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (8-11)**

Lab Sample ID: 480-23564-3
Client Matrix: Solid

% Moisture: 21.8

Date Sampled: 08/06/2012 1430
Date Received: 08/07/2012 1330

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75796	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75790	Lab File ID:	P2876.D
Dilution:	1.0			Initial Weight/Volume:	5.08 g
Analysis Date:	08/09/2012 0421			Final Weight/Volume:	5 mL
Prep Date:	08/08/2012 2229				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.77	6.3
Xylenes, Total		~~1.3~~ 13 U8	~~J B~~	1.1	13

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	85		64 - 126
4-Bromofluorobenzene (Surr)	106		72 - 126
Toluene-d8 (Surr)	100		71 - 125

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (22-24)**

Lab Sample ID: 480-23564-4
Client Matrix: Solid

% Moisture: 9.1

Date Sampled: 08/06/2012 1440
Date Received: 08/07/2012 1330

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75796	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75790	Lab File ID:	P2877.D
Dilution:	1.0			Initial Weight/Volume:	5.01 g
Analysis Date:	08/09/2012 0447			Final Weight/Volume:	5 mL
Prep Date:	08/08/2012 2229				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.40	5.5
1,1,2,2-Tetrachloroethane		ND		0.89	5.5
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.3	5.5
1,1,2-Trichloroethane		ND		0.71	5.5
1,1-Dichloroethane		ND		0.67	5.5
1,1-Dichloroethene		ND		0.67	5.5
1,2,4-Trichlorobenzene		ND		0.33	5.5
1,2-Dibromo-3-Chloropropane		ND		2.7	5.5
1,2-Dibromoethane		ND		0.71	5.5
1,2-Dichlorobenzene		ND		0.43	5.5
1,2-Dichloroethane		ND		0.28	5.5
1,2-Dichloropropane		ND		2.7	5.5
1,3-Dichlorobenzene		ND		0.28	5.5
1,4-Dichlorobenzene		ND		0.77	5.5
2-Butanone (MEK)		200		2.0	27
2-Hexanone		ND		2.7	27
4-Methyl-2-pentanone (MIBK)		ND		1.8	27
Acetone		ND		4.6	27
Benzene		ND		0.27	5.5
Bromodichloromethane		ND		0.74	5.5
Bromoform		ND		2.7	5.5
Bromomethane		ND	J	0.49	5.5
Carbon disulfide		ND		2.7	5.5
Carbon tetrachloride		ND		0.53	5.5
Chlorobenzene		ND		0.73	5.5
Chloroethane		ND	J	1.2	5.5
Chloroform		ND		0.34	5.5
Chloromethane		ND		0.33	5.5
cis-1,2-Dichloroethene		ND		0.70	5.5
cis-1,3-Dichloropropene		ND		0.79	5.5
Cyclohexane		ND		0.77	5.5
Dibromochloromethane		ND		0.70	5.5
Dichlorodifluoromethane		ND	J	0.45	5.5
Ethylbenzene		ND		0.38	5.5
Isopropylbenzene		ND		0.83	5.5
Methyl acetate		ND		1.0	5.5
Methyl tert-butyl ether		ND		0.54	5.5
Methylcyclohexane		ND		0.83	5.5
Methylene Chloride		ND		2.5	5.5
Styrene		ND		0.27	5.5
Tetrachloroethene		ND		0.74	5.5
Toluene		ND		0.42	5.5
trans-1,2-Dichloroethene		ND		0.57	5.5
trans-1,3-Dichloropropene		ND		2.4	5.5
Trichloroethene		ND		1.2	5.5
Trichlorofluoromethane		ND	J	0.52	5.5

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (22-24)**

Lab Sample ID: 480-23564-4
Client Matrix: Solid

% Moisture: 9.1

Date Sampled: 08/06/2012 1440
Date Received: 08/07/2012 1330

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-75796	Instrument ID:	HP5973P
Prep Method:	5035	Prep Batch:	480-75790	Lab File ID:	P2877.D
Dilution:	1.0			Initial Weight/Volume:	5.01 g
Analysis Date:	08/09/2012 0447			Final Weight/Volume:	5 mL
Prep Date:	08/08/2012 2229				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.67	5.5
Xylenes, Total		~~1.0~~ 11 UB	~~J B~~	0.92	11

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	82		64 - 126
4-Bromofluorobenzene (Surr)	110		72 - 126
Toluene-d8 (Surr)	106		71 - 125

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (9.5-10.8)**

Lab Sample ID: 480-23453-1
Client Matrix: Solid

% Moisture: 20.4

Date Sampled: 08/01/2012 1440
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3727.D
Dilution:	1.0			Initial Weight/Volume:	+30.26 g
Analysis Date:	08/06/2012 1551			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		13	210
bis (2-chloroisopropyl) ether		ND		22	210
2,4,5-Trichlorophenol		ND		46	210
2,4,6-Trichlorophenol		ND		14	210
2,4-Dichlorophenol		ND		11	210
2,4-Dimethylphenol		ND		57	210
2,4-Dinitrophenol		ND		74	410
2,4-Dinitrotoluene		ND		33	210
2,6-Dinitrotoluene		ND		51	210
2-Chloronaphthalene		ND		14	210
2-Chlorophenol		ND		11	210
2-Methylnaphthalene		ND		2.5	210
2-Methylphenol		ND		6.5	210
2-Nitroaniline		ND		67	410
2-Nitrophenol		ND		9.6	210
3,3'-Dichlorobenzidine		ND		180	210
3-Nitroaniline		ND		48	410
4,6-Dinitro-2-methylphenol		ND		73	410
4-Bromophenyl phenyl ether		ND		67	210
4-Chloro-3-methylphenol		ND		8.7	210
4-Chloroaniline		ND		62	210
4-Chlorophenyl phenyl ether		ND		4.5	210
4-Methylphenol		ND		12	410
4-Nitroaniline		ND		23	410
4-Nitrophenol		ND		51	410
Acenaphthene		ND		2.5	210
Acenaphthylene		ND		1.7	210
Acetophenone		ND		11	210
Anthracene		ND		5.4	210
Atrazine		ND		9.4	210
Benzaldehyde		ND		23	210
Benzo(a)anthracene		ND		3.6	210
Benzo(a)pyrene		22	J	5.1	210
Benzo(b)fluoranthene		35	J	4.1	210
Benzo(g,h,i)perylene		ND		2.5	210
Benzo(k)fluoranthene		16	J	2.3	210
Bis(2-chloroethoxy)methane		ND		11	210
Bis(2-chloroethyl)ether		ND		18	210
Bis(2-ethylhexyl) phthalate		ND		68	210
Butyl benzyl phthalate		ND		56	210
Caprolactam		ND		91	210
Carbazole		ND		2.4	210
Chrysene		26	J	2.1	210
Di-n-butyl phthalate		ND		73	210
Di-n-octyl phthalate		ND		4.9	210
Dibenz(a,h)anthracene		ND		2.5	210

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (9.5-10.8)**

Lab Sample ID: 480-23453-1
Client Matrix: Solid

% Moisture: 20.4

Date Sampled: 08/01/2012 1440
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3727.D
Dilution:	1.0			Initial Weight/Volume:	+30.26 g
Analysis Date:	08/06/2012 1551			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		2.2	210
Diethyl phthalate		ND		6.4	210
Dimethyl phthalate		ND		5.5	210
Fluoranthene		39	J	3.0	210
Fluorene		ND		4.8	210
Hexachlorobenzene		ND		10	210
Hexachlorobutadiene		ND		11	210
Hexachlorocyclopentadiene		ND		64	210
Hexachloroethane		ND		16	210
Indeno(1,2,3-cd)pyrene		ND		5.8	210
Isophorone		ND		11	210
N-Nitrosodi-n-propylamine		ND		17	210
N-Nitrosodiphenylamine		ND		11	210
Naphthalene		ND		3.5	210
Nitrobenzene		ND		9.3	210
Pentachlorophenol		ND		72	410
Phenanthrene		25	J	4.4	210
Phenol		ND		22	210
Pyrene		30	J	1.4	210

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	95		39 - 146
2-Fluorobiphenyl	74		37 - 120
2-Fluorophenol	60		18 - 120
Nitrobenzene-d5	70		34 - 132
p-Terphenyl-d14	95		65 - 153
Phenol-d5	69		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (22-25)**

Lab Sample ID: 480-23453-2
Client Matrix: Solid

% Moisture: 17.0

Date Sampled: 08/01/2012 1450
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3728.D
Dilution:	1.0			Initial Weight/Volume:	+30.57 g
Analysis Date:	08/06/2012 1615			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		12	200
bis (2-chloroisopropyl) ether		ND		21	200
2,4,5-Trichlorophenol		ND		44	200
2,4,6-Trichlorophenol		ND		13	200
2,4-Dichlorophenol		ND		10	200
2,4-Dimethylphenol		ND		54	200
2,4-Dinitrophenol		ND		70	390
2,4-Dinitrotoluene		ND		31	200
2,6-Dinitrotoluene		ND		49	200
2-Chloronaphthalene		ND		13	200
2-Chlorophenol		ND		10	200
2-Methylnaphthalene		ND		2.4	200
2-Methylphenol		ND		6.1	200
2-Nitroaniline		ND		64	390
2-Nitrophenol		ND		9.1	200
3,3'-Dichlorobenzidine		ND		180	200
3-Nitroaniline		ND		46	390
4,6-Dinitro-2-methylphenol		ND		69	390
4-Bromophenyl phenyl ether		ND		64	200
4-Chloro-3-methylphenol		ND		8.2	200
4-Chloroaniline		ND		59	200
4-Chlorophenyl phenyl ether		ND		4.3	200
4-Methylphenol		ND		11	390
4-Nitroaniline		ND		22	390
4-Nitrophenol		ND		48	390
Acenaphthene		ND		2.3	200
Acenaphthylene		ND		1.6	200
Acetophenone		ND		10	200
Anthracene		ND		5.1	200
Atrazine		ND		8.9	200
Benzaldehyde		ND		22	200
Benzo(a)anthracene		28	J	3.4	200
Benzo(a)pyrene		26	J	4.8	200
Benzo(b)fluoranthene		39	J	3.9	200
Benzo(g,h,i)perylene		ND		2.4	200
Benzo(k)fluoranthene		16	J	2.2	200
Bis(2-chloroethoxy)methane		ND		11	200
Bis(2-chloroethyl)ether		ND		17	200
Bis(2-ethylhexyl) phthalate		290		64	200
Butyl benzyl phthalate		ND		54	200
Caprolactam		ND		86	200
Carbazole		ND		2.3	200
Chrysene		30	J	2.0	200
Di-n-butyl phthalate		ND		69	200
Di-n-octyl phthalate		ND		4.7	200
Dibenz(a,h)anthracene		ND		2.3	200

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (22-25)**

Lab Sample ID: 480-23453-2
Client Matrix: Solid

% Moisture: 17.0

Date Sampled: 08/01/2012 1450
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3728.D
Dilution:	1.0			Initial Weight/Volume:	+30.57 g
Analysis Date:	08/06/2012 1615			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		2.1	200
Diethyl phthalate		ND		6.0	200
Dimethyl phthalate		ND		5.2	200
Fluoranthene		44	J	2.9	200
Fluorene		ND		4.6	200
Hexachlorobenzene		ND		9.9	200
Hexachlorobutadiene		ND		10	200
Hexachlorocyclopentadiene		ND		60	200
Hexachloroethane		ND		15	200
Indeno(1,2,3-cd)pyrene		12	J	5.5	200
Isophorone		ND		10	200
N-Nitrosodi-n-propylamine		ND		16	200
N-Nitrosodiphenylamine		ND		11	200
Naphthalene		ND		3.3	200
Nitrobenzene		ND		8.8	200
Pentachlorophenol		ND		68	390
Phenanthrene		30	J	4.2	200
Phenol		ND		21	200
Pyrene		35	J	1.3	200

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	80		39 - 146
2-Fluorobiphenyl	63		37 - 120
2-Fluorophenol	48		18 - 120
Nitrobenzene-d5	55		34 - 132
p-Terphenyl-d14	81		65 - 153
Phenol-d5	56		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (8-14)**

Lab Sample ID: 480-23453-3
Client Matrix: Solid

% Moisture: 12.7

Date Sampled: 08/02/2012 0840
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3729.D
Dilution:	10			Initial Weight/Volume:	+30.22 g
Analysis Date:	08/06/2012 1639			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		120	1900
bis (2-chloroisopropyl) ether		ND		200	1900
2,4,5-Trichlorophenol		ND		420	1900
2,4,6-Trichlorophenol		ND		130	1900
2,4-Dichlorophenol		ND		100	1900
2,4-Dimethylphenol		ND		520	1900
2,4-Dinitrophenol		ND		670	3800
2,4-Dinitrotoluene		ND		300	1900
2,6-Dinitrotoluene		ND		470	1900
2-Chloronaphthalene		ND		130	1900
2-Chlorophenol		ND		98	1900
2-Methylnaphthalene		ND		23	1900
2-Methylphenol		ND		59	1900
2-Nitroaniline		ND		620	3800
2-Nitrophenol		ND		88	1900
3,3'-Dichlorobenzidine		ND		1700	1900
3-Nitroaniline		ND		440	3800
4,6-Dinitro-2-methylphenol		ND		660	3800
4-Bromophenyl phenyl ether		ND		610	1900
4-Chloro-3-methylphenol		ND		79	1900
4-Chloroaniline		ND		560	1900
4-Chlorophenyl phenyl ether		ND		41	1900
4-Methylphenol		ND		110	3800
4-Nitroaniline		ND		210	3800
4-Nitrophenol		ND		470	3800
Acenaphthene		ND		23	1900
Acenaphthylene		ND		16	1900
Acetophenone		ND		98	1900
Anthracene		ND		49	1900
Atrazine		ND		85	1900
Benzaldehyde		ND		210	1900
Benzo(a)anthracene		290	J	33	1900
Benzo(a)pyrene		270	J	46	1900
Benzo(b)fluoranthene		450	J	37	1900
Benzo(g,h,i)perylene		ND		23	1900
Benzo(k)fluoranthene		180	J	21	1900
Bis(2-chloroethoxy)methane		ND		100	1900
Bis(2-chloroethyl)ether		ND		170	1900
Bis(2-ethylhexyl) phthalate		ND		620	1900
Butyl benzyl phthalate		ND		520	1900
Caprolactam		ND		830	1900
Carbazole		ND		22	1900
Chrysene		290	J	19	1900
Di-n-butyl phthalate		ND		660	1900
Di-n-octyl phthalate		ND		45	1900
Dibenz(a,h)anthracene		ND		23	1900

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (8-14)**

Lab Sample ID: 480-23453-3
Client Matrix: Solid

% Moisture: 12.7

Date Sampled: 08/02/2012 0840
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3729.D
Dilution:	10			Initial Weight/Volume:	+30.22 g
Analysis Date:	08/06/2012 1639			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		20	1900
Diethyl phthalate		ND		58	1900
Dimethyl phthalate		ND		50	1900
Fluoranthene		520	J	28	1900
Fluorene		ND		44	1900
Hexachlorobenzene		ND		95	1900
Hexachlorobutadiene		ND		98	1900
Hexachlorocyclopentadiene		ND		580	1900
Hexachloroethane		ND		150	1900
Indeno(1,2,3-cd)pyrene		ND		53	1900
Isophorone		ND		96	1900
N-Nitrosodi-n-propylamine		ND		150	1900
N-Nitrosodiphenylamine		ND		100	1900
Naphthalene		ND		32	1900
Nitrobenzene		ND		85	1900
Pentachlorophenol		ND		660	3800
Phenanthrene		410	J	40	1900
Phenol		ND		200	1900
Pyrene		390	J	12	1900

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	72		39 - 146
2-Fluorobiphenyl	95		37 - 120
2-Fluorophenol	68		18 - 120
Nitrobenzene-d5	83		34 - 132
p-Terphenyl-d14	110		65 - 153
Phenol-d5	85		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (20-22)**

Lab Sample ID: 480-23453-4
Client Matrix: Solid

% Moisture: 32.9

Date Sampled: 08/02/2012 0900
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3730.D
Dilution:	10			Initial Weight/Volume:	+30.48 g
Analysis Date:	08/06/2012 1703			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		150	2500
bis (2-chloroisopropyl) ether		ND		260	2500
2,4,5-Trichlorophenol		ND		540	2500
2,4,6-Trichlorophenol		ND		160	2500
2,4-Dichlorophenol		ND		130	2500
2,4-Dimethylphenol		ND		670	2500
2,4-Dinitrophenol		ND		870	4800
2,4-Dinitrotoluene		ND		380	2500
2,6-Dinitrotoluene		ND		610	2500
2-Chloronaphthalene		ND		170	2500
2-Chlorophenol		ND		130	2500
2-Methylnaphthalene		460	J	30	2500
2-Methylphenol		ND		76	2500
2-Nitroaniline		ND		790	4800
2-Nitrophenol		ND		110	2500
3,3'-Dichlorobenzidine		ND		2200	2500
3-Nitroaniline		ND		570	4800
4,6-Dinitro-2-methylphenol		ND		850	4800
4-Bromophenyl phenyl ether		ND		790	2500
4-Chloro-3-methylphenol		ND		100	2500
4-Chloroaniline		ND		730	2500
4-Chlorophenyl phenyl ether		ND		53	2500
4-Methylphenol		ND		140	4800
4-Nitroaniline		ND		280	4800
4-Nitrophenol		ND		600	4800
Acenaphthene		1100	J	29	2500
Acenaphthylene		220	J	20	2500
Acetophenone		ND		130	2500
Anthracene		1300	J	63	2500
Atrazine		ND		110	2500
Benzaldehyde		ND		270	2500
Benzo(a)anthracene		3400		43	2500
Benzo(a)pyrene		3100		60	2500
Benzo(b)fluoranthene		4600		48	2500
Benzo(g,h,i)perylene		1000	J	30	2500
Benzo(k)fluoranthene		1800	J	27	2500
Bis(2-chloroethoxy)methane		ND		130	2500
Bis(2-chloroethyl)ether		ND		210	2500
Bis(2-ethylhexyl) phthalate		ND		800	2500
Butyl benzyl phthalate		ND		660	2500
Caprolactam		ND		1100	2500
Carbazole		470	J	29	2500
Chrysene		3300		25	2500
Di-n-butyl phthalate		ND		860	2500
Di-n-octyl phthalate		ND		58	2500
Dibenz(a,h)anthracene		430	J	29	2500

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (20-22)**

Lab Sample ID: 480-23453-4
Client Matrix: Solid

% Moisture: 32.9

Date Sampled: 08/02/2012 0900
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3730.D
Dilution:	10			Initial Weight/Volume:	+30.48 g
Analysis Date:	08/06/2012 1703			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		700	J	26	2500
Diethyl phthalate		ND		75	2500
Dimethyl phthalate		ND		65	2500
Fluoranthene		7200		36	2500
Fluorene		1200	J	57	2500
Hexachlorobenzene		ND		120	2500
Hexachlorobutadiene		ND		130	2500
Hexachlorocyclopentadiene		ND		750	2500
Hexachloroethane		ND		190	2500
Indeno(1,2,3-cd)pyrene		980	J	68	2500
Isophorone		ND		120	2500
N-Nitrosodi-n-propylamine		ND		200	2500
N-Nitrosodiphenylamine		ND		140	2500
Naphthalene		2100	J	41	2500
Nitrobenzene		ND		110	2500
Pentachlorophenol		ND		850	4800
Phenanthrene		5600		52	2500
Phenol		ND		260	2500
Pyrene		5600		16	2500

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	76		39 - 146
2-Fluorobiphenyl	94		37 - 120
2-Fluorophenol	66		18 - 120
Nitrobenzene-d5	85		34 - 132
p-Terphenyl-d14	106		65 - 153
Phenol-d5	78		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (8-10)**

Lab Sample ID: 480-23453-5
Client Matrix: Solid

% Moisture: 18.8

Date Sampled: 08/02/2012 1120
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3731.D
Dilution:	5.0			Initial Weight/Volume:	+30.46 g
Analysis Date:	08/06/2012 1727			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		64	1000
bis (2-chloroisopropyl) ether		ND		110	1000
2,4,5-Trichlorophenol		ND		220	1000
2,4,6-Trichlorophenol		ND		67	1000
2,4-Dichlorophenol		ND		54	1000
2,4-Dimethylphenol		ND		280	1000
2,4-Dinitrophenol		ND		360	2000
2,4-Dinitrotoluene		ND		160	1000
2,6-Dinitrotoluene		ND		250	1000
2-Chloronaphthalene		ND		69	1000
2-Chlorophenol		ND		52	1000
2-Methylnaphthalene		ND		12	1000
2-Methylphenol		ND		31	1000
2-Nitroaniline		ND		330	2000
2-Nitrophenol		ND		47	1000
3,3'-Dichlorobenzidine		ND		900	1000
3-Nitroaniline		ND		240	2000
4,6-Dinitro-2-methylphenol		ND		350	2000
4-Bromophenyl phenyl ether		ND		330	1000
4-Chloro-3-methylphenol		ND		42	1000
4-Chloroaniline		ND		300	1000
4-Chlorophenyl phenyl ether		ND		22	1000
4-Methylphenol		ND		57	2000
4-Nitroaniline		ND		110	2000
4-Nitrophenol		ND		250	2000
Acenaphthene		ND		12	1000
Acenaphthylene		ND		8.4	1000
Acetophenone		ND		53	1000
Anthracene		ND		26	1000
Atrazine		ND		46	1000
Benzaldehyde		ND		110	1000
Benzo(a)anthracene		ND		18	1000
Benzo(a)pyrene		ND		25	1000
Benzo(b)fluoranthene		65	J	20	1000
Benzo(g,h,i)perylene		ND		12	1000
Benzo(k)fluoranthene		ND		11	1000
Bis(2-chloroethoxy)methane		ND		56	1000
Bis(2-chloroethyl)ether		ND		88	1000
Bis(2-ethylhexyl) phthalate		ND		330	1000
Butyl benzyl phthalate		ND		270	1000
Caprolactam		ND		440	1000
Carbazole		ND		12	1000
Chrysene		ND		10	1000
Di-n-butyl phthalate		ND		350	1000
Di-n-octyl phthalate		ND		24	1000
Dibenz(a,h)anthracene		ND		12	1000

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (8-10)**

Lab Sample ID: 480-23453-5
Client Matrix: Solid

% Moisture: 18.8

Date Sampled: 08/02/2012 1120
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3731.D
Dilution:	5.0			Initial Weight/Volume:	+30.46 g
Analysis Date:	08/06/2012 1727			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		11	1000
Diethyl phthalate		ND		31	1000
Dimethyl phthalate		ND		27	1000
Fluoranthene		ND		15	1000
Fluorene		ND		24	1000
Hexachlorobenzene		ND		51	1000
Hexachlorobutadiene		ND		52	1000
Hexachlorocyclopentadiene		ND		310	1000
Hexachloroethane		ND		79	1000
Indeno(1,2,3-cd)pyrene		ND		28	1000
Isophorone		ND		51	1000
N-Nitrosodi-n-propylamine		ND		81	1000
N-Nitrosodiphenylamine		ND		56	1000
Naphthalene		ND		17	1000
Nitrobenzene		ND		45	1000
Pentachlorophenol		ND		350	2000
Phenanthrene		ND		21	1000
Phenol		ND		110	1000
Pyrene		ND		6.6	1000

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	39		39 - 146
2-Fluorobiphenyl	45		37 - 120
2-Fluorophenol	38		18 - 120
Nitrobenzene-d5	39		34 - 132
p-Terphenyl-d14	57	X	65 - 153
Phenol-d5	44		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (18-21)**

Lab Sample ID: 480-23453-6
Client Matrix: Solid

% Moisture: 38.4

Date Sampled: 08/02/2012 1130
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3732.D
Dilution:	10			Initial Weight/Volume:	+30.81 g
Analysis Date:	08/06/2012 1751			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		320	J	170	2700
bis (2-chloroisopropyl) ether		ND		280	2700
2,4,5-Trichlorophenol		ND		580	2700
2,4,6-Trichlorophenol		ND		180	2700
2,4-Dichlorophenol		ND		140	2700
2,4-Dimethylphenol		ND		720	2700
2,4-Dinitrophenol		ND		930	5200
2,4-Dinitrotoluene		ND		410	2700
2,6-Dinitrotoluene		ND		650	2700
2-Chloronaphthalene		ND		180	2700
2-Chlorophenol		ND		140	2700
2-Methylnaphthalene		2900		32	2700
2-Methylphenol		ND		82	2700
2-Nitroaniline		ND		860	5200
2-Nitrophenol		ND		120	2700
3,3'-Dichlorobenzidine		ND		2300	2700
3-Nitroaniline		ND		610	5200
4,6-Dinitro-2-methylphenol		ND		920	5200
4-Bromophenyl phenyl ether		ND		850	2700
4-Chloro-3-methylphenol		ND		110	2700
4-Chloroaniline		ND		780	2700
4-Chlorophenyl phenyl ether		ND		57	2700
4-Methylphenol		ND		150	5200
4-Nitroaniline		ND		300	5200
4-Nitrophenol		ND		650	5200
Acenaphthene		2900		31	2700
Acenaphthylene		890	J	22	2700
Acetophenone		ND		140	2700
Anthracene		3500		68	2700
Atrazine		ND		120	2700
Benzaldehyde		ND		290	2700
Benzo(a)anthracene		9000		46	2700
Benzo(a)pyrene		8800		64	2700
Benzo(b)fluoranthene		13000		52	2700
Benzo(g,h,i)perylene		2800		32	2700
Benzo(k)fluoranthene		4600		29	2700
Bis(2-chloroethoxy)methane		ND		150	2700
Bis(2-chloroethyl)ether		ND		230	2700
Bis(2-ethylhexyl) phthalate		ND		860	2700
Butyl benzyl phthalate		ND		720	2700
Caprolactam		ND		1200	2700
Carbazole		690	J	31	2700
Chrysene		8000		27	2700
Di-n-butyl phthalate		ND		920	2700
Di-n-octyl phthalate		ND		62	2700
Dibenz(a,h)anthracene		630	J	31	2700

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (18-21)**

Lab Sample ID: 480-23453-6
Client Matrix: Solid

% Moisture: 38.4

Date Sampled: 08/02/2012 1130
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3732.D
Dilution:	10			Initial Weight/Volume:	+30.81 g
Analysis Date:	08/06/2012 1751			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		1300	J	28	2700
Diethyl phthalate		ND		81	2700
Dimethyl phthalate		ND		70	2700
Fluoranthene		17000		39	2700
Fluorene		2300	J	62	2700
Hexachlorobenzene		ND		130	2700
Hexachlorobutadiene		ND		140	2700
Hexachlorocyclopentadiene		ND		810	2700
Hexachloroethane		ND		210	2700
Indeno(1,2,3-cd)pyrene		2400	J	74	2700
Isophorone		ND		130	2700
N-Nitrosodi-n-propylamine		ND		210	2700
N-Nitrosodiphenylamine		ND		150	2700
Naphthalene		6600		44	2700
Nitrobenzene		ND		120	2700
Pentachlorophenol		ND		920	5200
Phenanthrene		12000		56	2700
Phenol		ND		280	2700
Pyrene		13000	J	17	2700

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	70		39 - 146
2-Fluorobiphenyl	93		37 - 120
2-Fluorophenol	61		18 - 120
Nitrobenzene-d5	91		34 - 132
p-Terphenyl-d14	103		65 - 153
Phenol-d5	78		11 - 120

Client Sample ID: **AW-01 (5-7)**

Lab Sample ID: 480-23453-7
Client Matrix: Solid % Moisture: 12.8

Date Sampled: 08/02/2012 1530
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3733.D
Dilution:	10			Initial Weight/Volume:	+30.30 g
Analysis Date:	08/06/2012 1815			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		120	1900
bis (2-chloroisopropyl) ether		ND		200	1900
2,4,5-Trichlorophenol		ND		420	1900
2,4,6-Trichlorophenol		ND		130	1900
2,4-Dichlorophenol		ND		100	1900
2,4-Dimethylphenol		ND		520	1900
2,4-Dinitrophenol		ND		670	3700
2,4-Dinitrotoluene		ND		300	1900
2,6-Dinitrotoluene		ND		470	1900
2-Chloronaphthalene		ND		130	1900
2-Chlorophenol		ND		98	1900
2-Methylnaphthalene		100	J	23	1900
2-Methylphenol		ND		59	1900
2-Nitroaniline		ND		610	3700
2-Nitrophenol		ND		88	1900
3,3'-Dichlorobenzidine		ND		1700	1900
3-Nitroaniline		ND		440	3700
4,6-Dinitro-2-methylphenol		ND		660	3700
4-Bromophenyl phenyl ether		ND		610	1900
4-Chloro-3-methylphenol		ND		79	1900
4-Chloroaniline		ND		560	1900
4-Chlorophenyl phenyl ether		ND		41	1900
4-Methylphenol		ND		110	3700
4-Nitroaniline		ND		210	3700
4-Nitrophenol		ND		460	3700
Acenaphthene		87	J	23	1900
Acenaphthylene		ND		16	1900
Acetophenone		ND		98	1900
Anthracene		200	J	49	1900
Atrazine		ND		85	1900
Benzaldehyde		ND		210	1900
Benzo(a)anthracene		580	J	33	1900
Benzo(a)pyrene		690	J	46	1900
Benzo(b)fluoranthene		1000	J	37	1900
Benzo(g,h,i)perylene		280	J	23	1900
Benzo(k)fluoranthene		380	J	21	1900
Bis(2-chloroethoxy)methane		ND		100	1900
Bis(2-chloroethyl)ether		ND		170	1900
Bis(2-ethylhexyl) phthalate		ND		620	1900
Butyl benzyl phthalate		ND		510	1900
Caprolactam		ND		830	1900
Carbazole		ND		22	1900
Chrysene		550	J	19	1900
Di-n-butyl phthalate		ND		660	1900
Di-n-octyl phthalate		ND		45	1900
Dibenz(a,h)anthracene		ND		23	1900

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-01 (5-7)**

Lab Sample ID: 480-23453-7
Client Matrix: Solid

% Moisture: 12.8

Date Sampled: 08/02/2012 1530
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3733.D
Dilution:	10			Initial Weight/Volume:	+30.30 g
Analysis Date:	08/06/2012 1815			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		20	1900
Diethyl phthalate		ND		58	1900
Dimethyl phthalate		ND		50	1900
Fluoranthene		1100	J	28	1900
Fluorene		ND		44	1900
Hexachlorobenzene		ND		95	1900
Hexachlorobutadiene		ND		98	1900
Hexachlorocyclopentadiene		ND		580	1900
Hexachloroethane		ND		150	1900
Indeno(1,2,3-cd)pyrene		260	J	53	1900
Isophorone		ND		96	1900
N-Nitrosodi-n-propylamine		ND		150	1900
N-Nitrosodiphenylamine		ND		100	1900
Naphthalene		ND		32	1900
Nitrobenzene		ND		85	1900
Pentachlorophenol		ND		660	3700
Phenanthrene		810	J	40	1900
Phenol		ND		200	1900
Pyrene		840	J	12	1900

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	65		39 - 146
2-Fluorobiphenyl	91		37 - 120
2-Fluorophenol	63		18 - 120
Nitrobenzene-d5	81		34 - 132
p-Terphenyl-d14	106		65 - 153
Phenol-d5	80		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-01 (20-22.5)**

Lab Sample ID: 480-23453-8
Client Matrix: Solid

% Moisture: 23.6

Date Sampled: 08/02/2012 1540
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3787.D
Dilution:	1.0			Initial Weight/Volume:	+30.27 g
Analysis Date:	08/07/2012 1039			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		14	220
bis (2-chloroisopropyl) ether		ND		23	220
2,4,5-Trichlorophenol		ND		48	220
2,4,6-Trichlorophenol		ND		14	220
2,4-Dichlorophenol		ND		11	220
2,4-Dimethylphenol		ND		59	220
2,4-Dinitrophenol		ND		77	430
2,4-Dinitrotoluene		ND		34	220
2,6-Dinitrotoluene		ND		54	220
2-Chloronaphthalene		ND		15	220
2-Chlorophenol		ND		11	220
2-Methylnaphthalene		ND		2.7	220
2-Methylphenol		ND		6.7	220
2-Nitroaniline		ND		70	430
2-Nitrophenol		ND		10	220
3,3'-Dichlorobenzidine		ND		190	220
3-Nitroaniline		ND		50	430
4,6-Dinitro-2-methylphenol		ND		76	430
4-Bromophenyl phenyl ether		ND		70	220
4-Chloro-3-methylphenol		ND		9.0	220
4-Chloroaniline		ND		64	220
4-Chlorophenyl phenyl ether		ND		4.7	220
4-Methylphenol		ND		12	430
4-Nitroaniline		ND		24	430
4-Nitrophenol		ND		53	430
Acenaphthene		17	J	2.6	220
Acenaphthylene		ND		1.8	220
Acetophenone		ND		11	220
Anthracene		27	J	5.6	220
Atrazine		ND		9.7	220
Benzaldehyde		ND		24	220
Benzo(a)anthracene		110	J	3.8	220
Benzo(a)pyrene		110	J	5.3	220
Benzo(b)fluoranthene		110	J	4.2	220
Benzo(g,h,i)perylene		58	J	2.6	220
Benzo(k)fluoranthene		57	J	2.4	220
Bis(2-chloroethoxy)methane		ND		12	220
Bis(2-chloroethyl)ether		ND		19	220
Bis(2-ethylhexyl) phthalate		140	J	71	220
Butyl benzyl phthalate		ND		59	220
Caprolactam		ND		95	220
Carbazole		ND		2.5	220
Chrysene		88	J	2.2	220
Di-n-butyl phthalate		ND		76	220
Di-n-octyl phthalate		ND		5.1	220
Dibenz(a,h)anthracene		28	J	2.6	220

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-01 (20-22.5)**

Lab Sample ID: 480-23453-8
Client Matrix: Solid

% Moisture: 23.6

Date Sampled: 08/02/2012 1540
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3787.D
Dilution:	1.0			Initial Weight/Volume:	+30.27 g
Analysis Date:	08/07/2012 1039			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		2.3	220
Diethyl phthalate		ND		6.6	220
Dimethyl phthalate		ND		5.7	220
Fluoranthene		150	J	3.2	220
Fluorene		ND		5.0	220
Hexachlorobenzene		ND		11	220
Hexachlorobutadiene		ND		11	220
Hexachlorocyclopentadiene		ND		66	220
Hexachloroethane		ND		17	220
Indeno(1,2,3-cd)pyrene		58	J	6.1	220
Isophorone		ND		11	220
N-Nitrosodi-n-propylamine		ND		17	220
N-Nitrosodiphenylamine		ND		12	220
Naphthalene		ND		3.6	220
Nitrobenzene		ND		9.7	220
Pentachlorophenol		ND		75	430
Phenanthrene		53	J	4.6	220
Phenol		ND		23	220
Pyrene		150	J	1.4	220

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	61		39 - 146
2-Fluorobiphenyl	49		37 - 120
2-Fluorophenol	38		18 - 120
Nitrobenzene-d5	42		34 - 132
p-Terphenyl-d14	78		65 - 153
Phenol-d5	43		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **RB-080212**

Lab Sample ID: 480-23453-9
Client Matrix: Water

Date Sampled: 08/02/2012 1640
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75666	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-75443	Lab File ID:	X8808.D
Dilution:	1.0			Initial Weight/Volume:	1050 mL
Analysis Date:	08/08/2012 1509			Final Weight/Volume:	1 mL
Prep Date:	08/07/2012 0914			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Biphenyl	ND		0.62	4.8
bis (2-chloroisopropyl) ether	ND		0.50	4.8
2,4,5-Trichlorophenol	ND		0.46	4.8
2,4,6-Trichlorophenol	ND		0.58	4.8
2,4-Dichlorophenol	ND		0.49	4.8
2,4-Dimethylphenol	ND		0.48	4.8
2,4-Dinitrophenol	ND		2.1	9.5
2,4-Dinitrotoluene	ND		0.43	4.8
2,6-Dinitrotoluene	ND		0.38	4.8
2-Chloronaphthalene	ND		0.44	4.8
2-Chlorophenol	ND		0.50	4.8
2-Methylnaphthalene	ND		0.57	4.8
2-Methylphenol	ND		0.38	4.8
2-Nitroaniline	ND		0.40	9.5
2-Nitrophenol	ND		0.46	4.8
3,3'-Dichlorobenzidine	ND		0.38	4.8
3-Nitroaniline	ND		0.46	9.5
4,6-Dinitro-2-methylphenol	ND		2.1	9.5
4-Bromophenyl phenyl ether	ND		0.43	4.8
4-Chloro-3-methylphenol	ND		0.43	4.8
4-Chloroaniline	ND		0.56	4.8
4-Chlorophenyl phenyl ether	ND		0.33	4.8
4-Methylphenol	ND		0.34	9.5
4-Nitroaniline	ND		0.24	9.5
4-Nitrophenol	ND		1.4	9.5
Acenaphthene	ND		0.39	4.8
Acenaphthylene	ND		0.36	4.8
Acetophenone	ND		0.51	4.8
Anthracene	ND		0.27	4.8
Atrazine	ND		0.44	4.8
Benzaldehyde	ND		0.25	4.8
Benzo(a)anthracene	ND		0.34	4.8
Benzo(a)pyrene	ND		0.45	4.8
Benzo(b)fluoranthene	ND		0.32	4.8
Benzo(g,h,i)perylene	ND		0.33	4.8
Benzo(k)fluoranthene	ND		0.70	4.8
Bis(2-chloroethoxy)methane	ND		0.33	4.8
Bis(2-chloroethyl)ether	ND		0.38	4.8
Bis(2-ethylhexyl) phthalate	ND		1.7	4.8
Butyl benzyl phthalate	ND		0.40	4.8
Caprolactam	ND		2.1	4.8
Carbazole	ND		0.29	4.8
Chrysene	ND		0.31	4.8
Di-n-butyl phthalate	ND		0.30	4.8
Di-n-octyl phthalate	ND		0.45	4.8
Dibenz(a,h)anthracene	ND		0.40	4.8

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **RB-080212**

Lab Sample ID: 480-23453-9
Client Matrix: Water

Date Sampled: 08/02/2012 1640
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75666	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-75443	Lab File ID:	X8808.D
Dilution:	1.0			Initial Weight/Volume:	1050 mL
Analysis Date:	08/08/2012 1509			Final Weight/Volume:	1 mL
Prep Date:	08/07/2012 0914			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dibenzofuran	ND		0.49	9.5
Diethyl phthalate	ND		0.21	4.8
Dimethyl phthalate	ND		0.34	4.8
Fluoranthene	ND		0.38	4.8
Fluorene	ND		0.34	4.8
Hexachlorobenzene	ND		0.49	4.8
Hexachlorobutadiene	ND		0.65	4.8
Hexachlorocyclopentadiene	ND		0.56	4.8
Hexachloroethane	ND		0.56	4.8
Indeno(1,2,3-cd)pyrene	ND		0.45	4.8
Isophorone	ND		0.41	4.8
N-Nitrosodi-n-propylamine	ND		0.51	4.8
N-Nitrosodiphenylamine	ND		0.49	4.8
Naphthalene	ND		0.72	4.8
Nitrobenzene	ND		0.28	4.8
Pentachlorophenol	ND		2.1	9.5
Phenanthrene	ND		0.42	4.8
Phenol	ND		0.37	4.8
Pyrene	ND		0.32	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	104		52 - 132
2-Fluorobiphenyl	81		48 - 120
2-Fluorophenol	39		20 - 120
Nitrobenzene-d5	90		46 - 120
p-Terphenyl-d14	113		67 - 150
Phenol-d5	27		16 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (10-12)**

Lab Sample ID: 480-23453-10
Client Matrix: Solid

% Moisture: 20.0

Date Sampled: 08/03/2012 0920
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3735.D
Dilution:	1.0			Initial Weight/Volume:	+30.08 g
Analysis Date:	08/06/2012 1903			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		31	J	13	210
bis (2-chloroisopropyl) ether		ND		22	210
2,4,5-Trichlorophenol		ND		46	210
2,4,6-Trichlorophenol		ND		14	210
2,4-Dichlorophenol		ND		11	210
2,4-Dimethylphenol		ND		57	210
2,4-Dinitrophenol		ND		74	410
2,4-Dinitrotoluene		ND		33	210
2,6-Dinitrotoluene		ND		51	210
2-Chloronaphthalene		ND		14	210
2-Chlorophenol		ND		11	210
2-Methylnaphthalene		37	J	2.5	210
2-Methylphenol		ND		6.5	210
2-Nitroaniline		ND		67	410
2-Nitrophenol		ND		9.6	210
3,3'-Dichlorobenzidine		ND		180	210
3-Nitroaniline		ND		48	410
4,6-Dinitro-2-methylphenol		ND		73	410
4-Bromophenyl phenyl ether		ND		67	210
4-Chloro-3-methylphenol		ND		8.7	210
4-Chloroaniline		ND		62	210
4-Chlorophenyl phenyl ether		ND		4.5	210
4-Methylphenol		ND		12	410
4-Nitroaniline		ND		23	410
4-Nitrophenol		ND		51	410
Acenaphthene		3900		2.5	210
Acenaphthylene		ND		1.7	210
Acetophenone		ND		11	210
Anthracene		2700		5.4	210
Atrazine		ND		9.4	210
Benzaldehyde		ND		23	210
Benzo(a)anthracene		1200		3.6	210
Benzo(a)pyrene		650		5.1	210
Benzo(b)fluoranthene		980		4.1	210
Benzo(g,h,i)perylene		170	J	2.5	210
Benzo(k)fluoranthene		410		2.3	210
Bis(2-chloroethoxy)methane		ND		11	210
Bis(2-chloroethyl)ether		ND		18	210
Bis(2-ethylhexyl) phthalate		100	J	68	210
Butyl benzyl phthalate		ND		56	210
Caprolactam		ND		91	210
Carbazole		310		2.4	210
Chrysene		910		2.1	210
Di-n-butyl phthalate		ND		73	210
Di-n-octyl phthalate		7.7	J	4.9	210
Dibenz(a,h)anthracene		69	J	2.5	210

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (10-12)**

Lab Sample ID: 480-23453-10
Client Matrix: Solid

% Moisture: 20.0

Date Sampled: 08/03/2012 0920
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75230	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3735.D
Dilution:	1.0			Initial Weight/Volume:	+30.08 g
Analysis Date:	08/06/2012 1903			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		2700		2.2	210
Diethyl phthalate		ND		6.4	210
Dimethyl phthalate		ND		5.5	210
Fluoranthene		5300		3.0	210
Fluorene		4000		4.8	210
Hexachlorobenzene		ND		10	210
Hexachlorobutadiene		ND		11	210
Hexachlorocyclopentadiene		ND		64	210
Hexachloroethane		ND		16	210
Indeno(1,2,3-cd)pyrene		170	J	5.8	210
Isophorone		ND		11	210
N-Nitrosodi-n-propylamine		ND		17	210
N-Nitrosodiphenylamine		ND		12	210
Naphthalene		57	J	3.5	210
Nitrobenzene		ND		9.3	210
Pentachlorophenol		ND		72	410
Phenanthrene		1100		4.4	210
Phenol		ND		22	210
Pyrene		3300		1.4	210

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	55		39 - 146
2-Fluorobiphenyl	50		37 - 120
2-Fluorophenol	39		18 - 120
Nitrobenzene-d5	46		34 - 132
p-Terphenyl-d14	63	X	65 - 153
Phenol-d5	44		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **DUP-080212**

Lab Sample ID: 480-23453-12
Client Matrix: Solid

% Moisture: 8.1

Date Sampled: 08/02/2012 0000
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3788.D
Dilution:	20			Initial Weight/Volume:	+30.09 g
Analysis Date:	08/07/2012 1103			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		230	3700
bis (2-chloroisopropyl) ether		ND		380	3700
2,4,5-Trichlorophenol		ND		800	3700
2,4,6-Trichlorophenol		ND		240	3700
2,4-Dichlorophenol		ND		190	3700
2,4-Dimethylphenol		ND		990	3700
2,4-Dinitrophenol		ND		1300	7200
2,4-Dinitrotoluene		ND		570	3700
2,6-Dinitrotoluene		ND		900	3700
2-Chloronaphthalene		ND		250	3700
2-Chlorophenol		ND		190	3700
2-Methylnaphthalene		ND		44	3700
2-Methylphenol		ND		110	3700
2-Nitroaniline		ND		1200	7200
2-Nitrophenol		ND		170	3700
3,3'-Dichlorobenzidine		ND		3200	3700
3-Nitroaniline		ND		840	7200
4,6-Dinitro-2-methylphenol		ND		1300	7200
4-Bromophenyl phenyl ether		ND		1200	3700
4-Chloro-3-methylphenol		ND		150	3700
4-Chloroaniline		ND		1100	3700
4-Chlorophenyl phenyl ether		ND		78	3700
4-Methylphenol		ND		200	7200
4-Nitroaniline		ND		410	7200
4-Nitrophenol		ND		890	7200
Acenaphthene		ND		43	3700
Acenaphthylene		ND		30	3700
Acetophenone		ND		190	3700
Anthracene		ND		94	3700
Atrazine		ND		160	3700
Benzaldehyde		ND		400	3700
Benzo(a)anthracene		ND		63	3700
Benzo(a)pyrene		710	J	88	3700
Benzo(b)fluoranthene		840	J	71	3700
Benzo(g,h,i)perylene		470	J	44	3700
Benzo(k)fluoranthene		360	J	40	3700
Bis(2-chloroethoxy)methane		ND		200	3700
Bis(2-chloroethyl)ether		ND		320	3700
Bis(2-ethylhexyl) phthalate		ND		1200	3700
Butyl benzyl phthalate		ND		980	3700
Caprolactam		ND		1600	3700
Carbazole		ND		42	3700
Chrysene		600	J	37	3700
Di-n-butyl phthalate		ND		1300	3700
Di-n-octyl phthalate		ND		86	3700
Dibenz(a,h)anthracene		ND		43	3700

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: DUP-080212

Lab Sample ID: 480-23453-12
Client Matrix: Solid

% Moisture: 8.1

Date Sampled: 08/02/2012 0000
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3788.D
Dilution:	20			Initial Weight/Volume:	+30.09 g
Analysis Date:	08/07/2012 1103			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		38	3700
Diethyl phthalate		ND		110	3700
Dimethyl phthalate		ND		96	3700
Fluoranthene		1200	J	53	3700
Fluorene		ND		84	3700
Hexachlorobenzene		ND		180	3700
Hexachlorobutadiene		ND		190	3700
Hexachlorocyclopentadiene		ND		1100	3700
Hexachloroethane		ND		280	3700
Indeno(1,2,3-cd)pyrene		400	J	100	3700
Isophorone		ND		180	3700
N-Nitrosodi-n-propylamine		ND		290	3700
N-Nitrosodiphenylamine		ND		200	3700
Naphthalene		ND		61	3700
Nitrobenzene		ND		160	3700
Pentachlorophenol		ND		1300	7200
Phenanthrene		800	J	77	3700
Phenol		ND		390	3700
Pyrene		1000	J	24	3700

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	48		39 - 146
2-Fluorobiphenyl	84		37 - 120
2-Fluorophenol	61		18 - 120
Nitrobenzene-d5	68		34 - 132
p-Terphenyl-d14	114		65 - 153
Phenol-d5	70		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (18-21)**

Lab Sample ID: 480-23453-13
Client Matrix: Solid

% Moisture: 16.0

Date Sampled: 08/03/2012 0930
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3789.D
Dilution:	1.0			Initial Weight/Volume:	+30.20 g
Analysis Date:	08/07/2012 1127			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		12	200
bis (2-chloroisopropyl) ether		ND		21	200
2,4,5-Trichlorophenol		ND		44	200
2,4,6-Trichlorophenol		ND		13	200
2,4-Dichlorophenol		ND		10	200
2,4-Dimethylphenol		ND		54	200
2,4-Dinitrophenol		ND		70	390
2,4-Dinitrotoluene		ND		31	200
2,6-Dinitrotoluene		ND		49	200
2-Chloronaphthalene		ND		13	200
2-Chlorophenol		ND		10	200
2-Methylnaphthalene		ND		2.4	200
2-Methylphenol		ND		6.1	200
2-Nitroaniline		ND		64	390
2-Nitrophenol		ND		9.1	200
3,3'-Dichlorobenzidine		ND		180	200
3-Nitroaniline		ND		46	390
4,6-Dinitro-2-methylphenol		ND		69	390
4-Bromophenyl phenyl ether		ND		64	200
4-Chloro-3-methylphenol		ND		8.2	200
4-Chloroaniline		ND		59	200
4-Chlorophenyl phenyl ether		ND		4.3	200
4-Methylphenol		ND		11	390
4-Nitroaniline		ND		22	390
4-Nitrophenol		ND		48	390
Acenaphthene		ND		2.3	200
Acenaphthylene		ND		1.6	200
Acetophenone		ND		10	200
Anthracene		ND		5.1	200
Atrazine		ND		8.9	200
Benzaldehyde		ND		22	200
Benzo(a)anthracene		ND		3.4	200
Benzo(a)pyrene		ND		4.8	200
Benzo(b)fluoranthene		ND		3.9	200
Benzo(g,h,i)perylene		ND		2.4	200
Benzo(k)fluoranthene		ND		2.2	200
Bis(2-chloroethoxy)methane		ND		11	200
Bis(2-chloroethyl)ether		ND		17	200
Bis(2-ethylhexyl) phthalate		ND		64	200
Butyl benzyl phthalate		ND		54	200
Caprolactam		ND		86	200
Carbazole		ND		2.3	200
Chrysene		ND		2.0	200
Di-n-butyl phthalate		ND		69	200
Di-n-octyl phthalate		ND		4.7	200
Dibenz(a,h)anthracene		ND		2.3	200

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (18-21)**

Lab Sample ID: 480-23453-13
Client Matrix: Solid

% Moisture: 16.0

Date Sampled: 08/03/2012 0930
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3789.D
Dilution:	1.0			Initial Weight/Volume:	+30.20 g
Analysis Date:	08/07/2012 1127			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		2.1	200
Diethyl phthalate		ND		6.0	200
Dimethyl phthalate		ND		5.2	200
Fluoranthene		ND		2.9	200
Fluorene		ND		4.6	200
Hexachlorobenzene		ND		9.9	200
Hexachlorobutadiene		ND		10	200
Hexachlorocyclopentadiene		ND		60	200
Hexachloroethane		ND		15	200
Indeno(1,2,3-cd)pyrene		ND		5.5	200
Isophorone		ND		10	200
N-Nitrosodi-n-propylamine		ND		16	200
N-Nitrosodiphenylamine		ND		11	200
Naphthalene		ND		3.3	200
Nitrobenzene		ND		8.8	200
Pentachlorophenol		ND		68	390
Phenanthrene		ND		4.2	200
Phenol		ND		21	200
Pyrene		ND		1.3	200

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	49		39 - 146
2-Fluorobiphenyl	45		37 - 120
2-Fluorophenol	45		18 - 120
Nitrobenzene-d5	50		34 - 132
p-Terphenyl-d14	69		65 - 153
Phenol-d5	48		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (8-10)**

Lab Sample ID: 480-23453-14
Client Matrix: Solid

% Moisture: 17.4

Date Sampled: 08/03/2012 1200
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3790.D
Dilution:	10			Initial Weight/Volume:	+30.55 g
Analysis Date:	08/07/2012 1151			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		120	2000
bis (2-chloroisopropyl) ether		ND		210	2000
2,4,5-Trichlorophenol		ND		440	2000
2,4,6-Trichlorophenol		ND		130	2000
2,4-Dichlorophenol		ND		110	2000
2,4-Dimethylphenol		ND		540	2000
2,4-Dinitrophenol		ND		700	3900
2,4-Dinitrotoluene		ND		310	2000
2,6-Dinitrotoluene		ND		490	2000
2-Chloronaphthalene		ND		130	2000
2-Chlorophenol		ND		100	2000
2-Methylnaphthalene		ND		24	2000
2-Methylphenol		ND		62	2000
2-Nitroaniline		ND		640	3900
2-Nitrophenol		ND		92	2000
3,3'-Dichlorobenzidine		ND		1800	2000
3-Nitroaniline		ND		460	3900
4,6-Dinitro-2-methylphenol		ND		690	3900
4-Bromophenyl phenyl ether		ND		640	2000
4-Chloro-3-methylphenol		ND		83	2000
4-Chloroaniline		ND		590	2000
4-Chlorophenyl phenyl ether		ND		43	2000
4-Methylphenol		ND		110	3900
4-Nitroaniline		ND		220	3900
4-Nitrophenol		ND		490	3900
Acenaphthene		ND		24	2000
Acenaphthylene		ND		16	2000
Acetophenone		ND		100	2000
Anthracene		ND		51	2000
Atrazine		ND		89	2000
Benzaldehyde		ND		220	2000
Benzo(a)anthracene		ND		35	2000
Benzo(a)pyrene		ND		48	2000
Benzo(b)fluoranthene		ND		39	2000
Benzo(g,h,i)perylene		ND		24	2000
Benzo(k)fluoranthene		ND		22	2000
Bis(2-chloroethoxy)methane		ND		110	2000
Bis(2-chloroethyl)ether		ND		170	2000
Bis(2-ethylhexyl) phthalate		ND		650	2000
Butyl benzyl phthalate		ND		540	2000
Caprolactam		ND		870	2000
Carbazole		ND		23	2000
Chrysene		130	J	20	2000
Di-n-butyl phthalate		ND		690	2000
Di-n-octyl phthalate		ND		47	2000
Dibenz(a,h)anthracene		ND		24	2000

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (8-10)**

Lab Sample ID: 480-23453-14
Client Matrix: Solid

% Moisture: 17.4

Date Sampled: 08/03/2012 1200
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3790.D
Dilution:	10			Initial Weight/Volume:	+30.55 g
Analysis Date:	08/07/2012 1151			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		21	2000
Diethyl phthalate		ND		61	2000
Dimethyl phthalate		ND		52	2000
Fluoranthene		160	J	29	2000
Fluorene		ND		46	2000
Hexachlorobenzene		ND		100	2000
Hexachlorobutadiene		ND		100	2000
Hexachlorocyclopentadiene		ND		610	2000
Hexachloroethane		ND		160	2000
Indeno(1,2,3-cd)pyrene		ND		55	2000
Isophorone		ND		100	2000
N-Nitrosodi-n-propylamine		ND		160	2000
N-Nitrosodiphenylamine		ND		110	2000
Naphthalene		ND		33	2000
Nitrobenzene		ND		89	2000
Pentachlorophenol		ND		690	3900
Phenanthrene		ND		42	2000
Phenol		ND		210	2000
Pyrene		ND		13	2000

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	30	X	39 - 146
2-Fluorobiphenyl	60		37 - 120
2-Fluorophenol	57		18 - 120
Nitrobenzene-d5	56		34 - 132
p-Terphenyl-d14	75		65 - 153
Phenol-d5	58		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (20-22)**

Lab Sample ID: 480-23453-15
Client Matrix: Solid

% Moisture: 22.2

Date Sampled: 08/03/2012 1210
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3791.D
Dilution:	1.0			Initial Weight/Volume:	+30.37 g
Analysis Date:	08/07/2012 1215			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		13	220
bis (2-chloroisopropyl) ether		ND		22	220
2,4,5-Trichlorophenol		ND		47	220
2,4,6-Trichlorophenol		ND		14	220
2,4-Dichlorophenol		ND		11	220
2,4-Dimethylphenol		ND		58	220
2,4-Dinitrophenol		ND		75	420
2,4-Dinitrotoluene		ND		33	220
2,6-Dinitrotoluene		ND		52	220
2-Chloronaphthalene		ND		14	220
2-Chlorophenol		ND		11	220
2-Methylnaphthalene		ND		2.6	220
2-Methylphenol		ND		6.6	220
2-Nitroaniline		ND		69	420
2-Nitrophenol		ND		9.8	220
3,3'-Dichlorobenzidine		ND		190	220
3-Nitroaniline		ND		49	420
4,6-Dinitro-2-methylphenol		ND		74	420
4-Bromophenyl phenyl ether		ND		68	220
4-Chloro-3-methylphenol		ND		8.8	220
4-Chloroaniline		ND		63	220
4-Chlorophenyl phenyl ether		ND		4.6	220
4-Methylphenol		ND		12	420
4-Nitroaniline		ND		24	420
4-Nitrophenol		ND		52	420
Acenaphthene		ND		2.5	220
Acenaphthylene		ND		1.8	220
Acetophenone		ND		11	220
Anthracene		ND		5.5	220
Atrazine		ND		9.5	220
Benzaldehyde		ND		24	220
Benzo(a)anthracene		ND		3.7	220
Benzo(a)pyrene		15	J	5.2	220
Benzo(b)fluoranthene		18	J	4.2	220
Benzo(g,h,i)perylene		ND		2.6	220
Benzo(k)fluoranthene		11	J	2.4	220
Bis(2-chloroethoxy)methane		ND		12	220
Bis(2-chloroethyl)ether		ND		19	220
Bis(2-ethylhexyl) phthalate		ND		69	220
Butyl benzyl phthalate		ND		58	220
Caprolactam		ND		93	220
Carbazole		ND		2.5	220
Chrysene		17	J	2.1	220
Di-n-butyl phthalate		ND		74	220
Di-n-octyl phthalate		ND		5.0	220
Dibenz(a,h)anthracene		ND		2.5	220

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (20-22)**

Lab Sample ID: 480-23453-15
Client Matrix: Solid

% Moisture: 22.2

Date Sampled: 08/03/2012 1210
Date Received: 08/03/2012 1500

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75444	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75163	Lab File ID:	V3791.D
Dilution:	1.0			Initial Weight/Volume:	+30.37 g
Analysis Date:	08/07/2012 1215			Final Weight/Volume:	1 mL
Prep Date:	08/04/2012 0838			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		ND		2.2	220
Diethyl phthalate		ND		6.5	220
Dimethyl phthalate		ND		5.6	220
Fluoranthene		31	J	3.1	220
Fluorene		ND		4.9	220
Hexachlorobenzene		ND		11	220
Hexachlorobutadiene		ND		11	220
Hexachlorocyclopentadiene		ND		65	220
Hexachloroethane		ND		17	220
Indeno(1,2,3-cd)pyrene		ND		5.9	220
Isophorone		ND		11	220
N-Nitrosodi-n-propylamine		ND		17	220
N-Nitrosodiphenylamine		ND		12	220
Naphthalene		ND		3.6	220
Nitrobenzene		ND		9.5	220
Pentachlorophenol		ND		74	420
Phenanthrene		15	J	4.5	220
Phenol		ND		23	220
Pyrene		28	J	1.4	220

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	68		39 - 146
2-Fluorobiphenyl	62		37 - 120
2-Fluorophenol	56		18 - 120
Nitrobenzene-d5	61		34 - 132
p-Terphenyl-d14	84		65 - 153
Phenol-d5	62		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-03 (8-10)**

Lab Sample ID: 480-23564-1
Client Matrix: Solid

% Moisture: 6.8

Date Sampled: 08/06/2012 1050
Date Received: 08/07/2012 1330

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-76451	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75643	Lab File ID:	V4044.D
Dilution:	20			Initial Weight/Volume:	+30.40 g
Analysis Date:	08/14/2012 1242			Final Weight/Volume:	1 mL
Prep Date:	08/08/2012 0836			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
2,4,5-Trichlorophenol		ND		780	3600
2,4,6-Trichlorophenol		ND		240	3600
2,4-Dichlorophenol		ND		190	3600
2,4-Dimethylphenol		ND		970	3600
2,4-Dinitrophenol		ND		1300	7000
2,4-Dinitrotoluene		ND		550	3600
2,6-Dinitrotoluene		ND		870	3600
2-Chloronaphthalene		ND		240	3600
2-Chlorophenol		ND		180	3600
2-Methylnaphthalene		ND		43	3600
2-Methylphenol		ND		110	3600
2-Nitroaniline		ND		1100	7000
2-Nitrophenol		ND		160	3600
3,3'-Dichlorobenzidine		ND		3100	3600
3-Nitroaniline		ND		820	7000
4,6-Dinitro-2-methylphenol		ND		1200	7000
4-Bromophenyl phenyl ether		ND		1100	3600
4-Chloro-3-methylphenol		ND		150	3600
4-Chloroaniline		ND		1000	3600
4-Chlorophenyl phenyl ether		ND		76	3600
4-Methylphenol		ND		200	7000
4-Nitroaniline		ND		400	7000
4-Nitrophenol		ND		870	7000
Acenaphthene		ND		42	3600
Acenaphthylene		ND		29	3600
Acetophenone		ND		180	3600
Anthracene		280	J	92	3600
Atrazine		ND		160	3600
Benzaldehyde		ND		390	3600
Benzo(a)anthracene		1100	J	62	3600
Benzo(a)pyrene		1100	J	86	3600
Benzo(b)fluoranthene		1400	J	69	3600
Benzo(g,h,i)perylene		560	J	43	3600
Benzo(k)fluoranthene		480	J	39	3600
Biphenyl		ND		220	3600
bis (2-chloroisopropyl) ether		ND		370	3600
Bis(2-chloroethoxy)methane		ND		190	3600
Bis(2-chloroethyl)ether		ND		310	3600
Bis(2-ethylhexyl) phthalate		1800	J	1200	3600
Butyl benzyl phthalate		ND		960	3600
Caprolactam		ND		1500	3600
Carbazole		ND		41	3600
Chrysene		1200	J	36	3600
Dibenz(a,h)anthracene		210	J	42	3600
Dibenzofuran		ND		37	3600
Diethyl phthalate		ND		110	3600

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-03 (8-10)**

Lab Sample ID: 480-23564-1
Client Matrix: Solid

% Moisture: 6.8

Date Sampled: 08/06/2012 1050
Date Received: 08/07/2012 1330

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-76451	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75643	Lab File ID:	V4044.D
Dilution:	20			Initial Weight/Volume:	+30.40 g
Analysis Date:	08/14/2012 1242			Final Weight/Volume:	1 mL
Prep Date:	08/08/2012 0836			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dimethyl phthalate		ND		93	3600
Di-n-butyl phthalate		ND		1200	3600
Di-n-octyl phthalate		ND		84	3600
Fluoranthene		2200	J	52	3600
Fluorene		ND		82	3600
Hexachlorobenzene		ND		180	3600
Hexachlorobutadiene		ND		180	3600
Hexachlorocyclopentadiene		ND		1100	3600
Hexachloroethane		ND		280	3600
Indeno(1,2,3-cd)pyrene		490	J	99	3600
Isophorone		ND		180	3600
Naphthalene		ND		60	3600
Nitrobenzene		ND		160	3600
N-Nitrosodi-n-propylamine		ND		280	3600
N-Nitrosodiphenylamine		ND		200	3600
Pentachlorophenol		ND		1200	7000
Phenanthrene		1600	J	75	3600
Phenol		ND		380	3600
Pyrene		1800	J	23	3600

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	69		39 - 146
2-Fluorobiphenyl	75		37 - 120
2-Fluorophenol	62		18 - 120
Nitrobenzene-d5	62		34 - 132
p-Terphenyl-d14	114		65 - 153
Phenol-d5	69		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-03- (20-22.5)**

Lab Sample ID: 480-23564-2
Client Matrix: Solid

% Moisture: 18.9

Date Sampled: 08/06/2012 1100
Date Received: 08/07/2012 1330

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-76451	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75643	Lab File ID:	V4045.D
Dilution:	1.0			Initial Weight/Volume:	+30.79 g
Analysis Date:	08/14/2012 1306			Final Weight/Volume:	1 mL
Prep Date:	08/08/2012 0836			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
2,4,5-Trichlorophenol		ND		44	200
2,4,6-Trichlorophenol		ND		13	200
2,4-Dichlorophenol		ND		11	200
2,4-Dimethylphenol		ND		55	200
2,4-Dinitrophenol		ND		71	400
2,4-Dinitrotoluene		ND		31	200
2,6-Dinitrotoluene		ND		50	200
2-Chloronaphthalene		ND		14	200
2-Chlorophenol		ND		10	200
2-Methylnaphthalene		ND		2.5	200
2-Methylphenol		ND		6.2	200
2-Nitroaniline		ND		65	400
2-Nitrophenol		ND		9.3	200
3,3'-Dichlorobenzidine		ND		180	200
3-Nitroaniline		ND		47	400
4,6-Dinitro-2-methylphenol		ND		70	400
4-Bromophenyl phenyl ether		ND		65	200
4-Chloro-3-methylphenol		ND		8.3	200
4-Chloroaniline		ND		60	200
4-Chlorophenyl phenyl ether		ND		4.3	200
4-Methylphenol		ND		11	400
4-Nitroaniline		ND		23	400
4-Nitrophenol		ND		49	400
Acenaphthene		14	J	2.4	200
Acenaphthylene		ND		1.7	200
Acetophenone		ND		10	200
Anthracene		ND		5.2	200
Atrazine		ND		9.0	200
Benzaldehyde		ND		22	200
Benzo(a)anthracene		ND		3.5	200
Benzo(a)pyrene		25	J	4.9	200
Benzo(b)fluoranthene		25	J	3.9	200
Benzo(g,h,i)perylene		ND		2.4	200
Benzo(k)fluoranthene		17	J	2.2	200
Biphenyl		ND		13	200
bis (2-chloroisopropyl) ether		ND		21	200
Bis(2-chloroethoxy)methane		ND		11	200
Bis(2-chloroethyl)ether		ND		18	200
Bis(2-ethylhexyl) phthalate		94	J	65	200
Butyl benzyl phthalate		ND		54	200
Caprolactam		ND		88	200
Carbazole		ND		2.3	200
Chrysene		25	J	2.0	200
Dibenz(a,h)anthracene		ND		2.4	200
Dibenzofuran		ND		2.1	200
Diethyl phthalate		ND		6.1	200

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-03- (20-22.5)**

Lab Sample ID: 480-23564-2
Client Matrix: Solid

% Moisture: 18.9

Date Sampled: 08/06/2012 1100
Date Received: 08/07/2012 1330

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-76451	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75643	Lab File ID:	V4045.D
Dilution:	1.0			Initial Weight/Volume:	+30.79 g
Analysis Date:	08/14/2012 1306			Final Weight/Volume:	1 mL
Prep Date:	08/08/2012 0836			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dimethyl phthalate		ND		5.3	200
Di-n-butyl phthalate		ND		70	200
Di-n-octyl phthalate		ND		4.7	200
Fluoranthene		31	J	2.9	200
Fluorene		ND		4.7	200
Hexachlorobenzene		ND		10	200
Hexachlorobutadiene		ND		10	200
Hexachlorocyclopentadiene		ND		61	200
Hexachloroethane		ND		16	200
Indeno(1,2,3-cd)pyrene		ND		5.6	200
Isophorone		ND		10	200
Naphthalene		ND		3.4	200
Nitrobenzene		ND		9.0	200
N-Nitrosodi-n-propylamine		ND		16	200
N-Nitrosodiphenylamine		ND		11	200
Pentachlorophenol		ND		70	400
Phenanthrene		ND		4.3	200
Phenol		ND		21	200
Pyrene		30	J	1.3	200

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	114		39 - 146
2-Fluorobiphenyl	94		37 - 120
2-Fluorophenol	80		18 - 120
Nitrobenzene-d5	96		34 - 132
p-Terphenyl-d14	119		65 - 153
Phenol-d5	89		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (8-11)**

Lab Sample ID: 480-23564-3
Client Matrix: Solid

% Moisture: 21.8

Date Sampled: 08/06/2012 1430
Date Received: 08/07/2012 1330

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-76451	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75643	Lab File ID:	V4057.D
Dilution:	5.0			Initial Weight/Volume:	+30.56 g
Analysis Date:	08/14/2012 1419			Final Weight/Volume:	1 mL
Prep Date:	08/08/2012 0836			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
2,4,5-Trichlorophenol		ND		230	1100
2,4,6-Trichlorophenol		ND		70	1100
2,4-Dichlorophenol		ND		56	1100
2,4-Dimethylphenol		ND		290	1100
2,4-Dinitrophenol		ND		370	2100
2,4-Dinitrotoluene		ND		160	1100
2,6-Dinitrotoluene		ND		260	1100
2-Chloronaphthalene		ND		71	1100
2-Chlorophenol		ND		54	1100
2-Methylnaphthalene		ND		13	1100
2-Methylphenol		ND		33	1100
2-Nitroaniline		ND		340	2100
2-Nitrophenol		ND		48	1100
3,3'-Dichlorobenzidine		ND		930	1100
3-Nitroaniline		ND		240	2100
4,6-Dinitro-2-methylphenol		ND		370	2100
4-Bromophenyl phenyl ether		ND		340	1100
4-Chloro-3-methylphenol		ND		44	1100
4-Chloroaniline		ND		310	1100
4-Chlorophenyl phenyl ether		ND		23	1100
4-Methylphenol		ND		59	2100
4-Nitroaniline		ND		120	2100
4-Nitrophenol		ND		260	2100
Acenaphthene		ND		12	1100
Acenaphthylene		ND		8.7	1100
Acetophenone		ND		54	1100
Anthracene		ND		27	1100
Atrazine		ND		47	1100
Benzaldehyde		ND		120	1100
Benzo(a)anthracene		ND		18	1100
Benzo(a)pyrene		ND		26	1100
Benzo(b)fluoranthene		62	J	21	1100
Benzo(g,h,i)perylene		ND		13	1100
Benzo(k)fluoranthene		ND		12	1100
Biphenyl		ND		66	1100
bis (2-chloroisopropyl) ether		ND		110	1100
Bis(2-chloroethoxy)methane		ND		58	1100
Bis(2-chloroethyl)ether		ND		92	1100
Bis(2-ethylhexyl) phthalate		ND		340	1100
Butyl benzyl phthalate		ND		280	1100
Caprolactam		ND		460	1100
Carbazole		ND		12	1100
Chrysene		ND		11	1100
Dibenz(a,h)anthracene		ND		12	1100
Dibenzofuran		ND		11	1100
Diethyl phthalate		ND		32	1100

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (8-11)**

Lab Sample ID: 480-23564-3
Client Matrix: Solid

% Moisture: 21.8

Date Sampled: 08/06/2012 1430
Date Received: 08/07/2012 1330

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-76451	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75643	Lab File ID:	V4057.D
Dilution:	5.0			Initial Weight/Volume:	+30.56 g
Analysis Date:	08/14/2012 1419			Final Weight/Volume:	1 mL
Prep Date:	08/08/2012 0836			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dimethyl phthalate		ND		28	1100
Di-n-butyl phthalate		ND		370	1100
Di-n-octyl phthalate		ND		25	1100
Fluoranthene		ND		15	1100
Fluorene		ND		24	1100
Hexachlorobenzene		ND		53	1100
Hexachlorobutadiene		ND		54	1100
Hexachlorocyclopentadiene		ND		320	1100
Hexachloroethane		ND		82	1100
Indeno(1,2,3-cd)pyrene		ND		29	1100
Isophorone		ND		53	1100
Naphthalene		ND		18	1100
Nitrobenzene		ND		47	1100
N-Nitrosodi-n-propylamine		ND		84	1100
N-Nitrosodiphenylamine		ND		58	1100
Pentachlorophenol		ND		360	2100
Phenanthrene		ND		22	1100
Phenol		ND		110	1100
Pyrene		ND		6.9	1100

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	86		39 - 146
2-Fluorobiphenyl	81		37 - 120
2-Fluorophenol	72		18 - 120
Nitrobenzene-d5	73		34 - 132
p-Terphenyl-d14	106		65 - 153
Phenol-d5	77		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (22-24)**

Lab Sample ID: 480-23564-4
Client Matrix: Solid

% Moisture: 9.1

Date Sampled: 08/06/2012 1440
Date Received: 08/07/2012 1330

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75846	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75643	Lab File ID:	V3877.D
Dilution:	1.0			Initial Weight/Volume:	+30.26 g
Analysis Date:	08/09/2012 1739			Final Weight/Volume:	1 mL
Prep Date:	08/08/2012 0836			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
2,4,5-Trichlorophenol		ND		40	190
2,4,6-Trichlorophenol		ND		12	190
2,4-Dichlorophenol		ND		9.7	190
2,4-Dimethylphenol		ND		50	190
2,4-Dinitrophenol		ND		64	360
2,4-Dinitrotoluene		ND		29	190
2,6-Dinitrotoluene		ND		45	190
2-Chloronaphthalene		ND		12	190
2-Chlorophenol		ND		9.4	190
2-Methylnaphthalene		ND		2.2	190
2-Methylphenol		ND		5.7	190
2-Nitroaniline		ND		59	360
2-Nitrophenol		ND		8.4	190
3,3'-Dichlorobenzidine		ND		160	190
3-Nitroaniline		ND		42	360
4,6-Dinitro-2-methylphenol		ND		64	360
4-Bromophenyl phenyl ether		ND		59	190
4-Chloro-3-methylphenol		ND		7.6	190
4-Chloroaniline		ND		54	190
4-Chlorophenyl phenyl ether		ND		3.9	190
4-Methylphenol		ND		10	360
4-Nitroaniline		ND		21	360
4-Nitrophenol		ND		45	360
Acenaphthene		ND		2.2	190
Acenaphthylene		ND		1.5	190
Acetophenone		ND		9.5	190
Anthracene		ND		4.7	190
Atrazine		ND		8.2	190
Benzaldehyde		ND		20	190
Benzo(a)anthracene		ND		3.2	190
Benzo(a)pyrene		9.4	J	4.4	190
Benzo(b)fluoranthene		14	J	3.6	190
Benzo(g,h,i)perylene		ND		2.2	190
Benzo(k)fluoranthene		8.8	J	2.0	190
Biphenyl		ND		11	190
bis (2-chloroisopropyl) ether		ND		19	190
Bis(2-chloroethoxy)methane		ND		10	190
Bis(2-chloroethyl)ether		ND		16	190
Bis(2-ethylhexyl) phthalate		430		59	190
Butyl benzyl phthalate		ND		49	190
Caprolactam		ND		80	190
Carbazole		ND		2.1	190
Chrysene		15	J	1.8	190
Dibenz(a,h)anthracene		ND		2.2	190
Dibenzofuran		ND		1.9	190
Diethyl phthalate		ND		5.6	190

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (22-24)**

Lab Sample ID: 480-23564-4
Client Matrix: Solid

% Moisture: 9.1

Date Sampled: 08/06/2012 1440
Date Received: 08/07/2012 1330

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-75846	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-75643	Lab File ID:	V3877.D
Dilution:	1.0			Initial Weight/Volume:	+30.26 g
Analysis Date:	08/09/2012 1739			Final Weight/Volume:	1 mL
Prep Date:	08/08/2012 0836			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dimethyl phthalate		ND		4.8	190
Di-n-butyl phthalate		ND		64	190
Di-n-octyl phthalate		ND		4.3	190
Fluoranthene		ND		2.7	190
Fluorene		ND		4.2	190
Hexachlorobenzene		ND		9.2	190
Hexachlorobutadiene		ND		9.4	190
Hexachlorocyclopentadiene		ND		56	190
Hexachloroethane		ND		14	190
Indeno(1,2,3-cd)pyrene		ND		5.1	190
Isophorone		ND		9.2	190
Naphthalene		ND		3.1	190
Nitrobenzene		ND		8.2	190
N-Nitrosodi-n-propylamine		ND		15	190
N-Nitrosodiphenylamine		ND		10	190
Pentachlorophenol		ND		63	360
Phenanthrene		ND		3.9	190
Phenol		ND		19	190
Pyrene		ND		1.2	190

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	96		39 - 146
2-Fluorobiphenyl	85		37 - 120
2-Fluorophenol	76		18 - 120
Nitrobenzene-d5	88		34 - 132
p-Terphenyl-d14	103		65 - 153
Phenol-d5	83		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (9.5-10.8)**

Lab Sample ID: 480-23453-1
Client Matrix: Solid

% Moisture: 20.4

Date Sampled: 08/01/2012 1440
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5046 g
Analysis Date:	08/07/2012 1417			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		5230	J	5.5	12.5
Antimony		ND		0.67	18.7
Arsenic		2.8		0.50	2.5
Barium		35.0	J	0.14	0.62
Beryllium		0.34		0.035	0.25
Cadmium		0.21	J	0.037	0.25
Calcium		2300	J B	4.1	62.3
Chromium		11.8	J	0.25	0.62
Cobalt		8.6		0.062	0.62
Copper		15.1		0.26	1.2
Iron		9890	J B	1.4	12.5
Lead		25.5	J	0.30	1.2
Magnesium		2450	B	1.2	24.9
Manganese		96.5		0.040	0.25
Nickel		19.9		0.29	6.2
Potassium		688	J	24.9	37.4
Selenium		ND		0.71	5.0
Silver		ND		0.25	0.62
Sodium		108	J	16.2	174
Thallium		ND		0.37	7.5
Vanadium		13.4	J	0.14	0.62
Zinc		59.2	J B	0.19	2.5

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.5993 g
Analysis Date:	08/06/2012 1504			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.013	J	0.010	0.025

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-05 (22-25)**

Lab Sample ID: 480-23453-2
Client Matrix: Solid

% Moisture: 17.0

Date Sampled: 08/01/2012 1450
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-76551	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I2081412A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4599 g
Analysis Date:	08/14/2012 1614			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		3210	J	5.8	13.1
Antimony		ND		0.71	19.7
Arsenic		1.9	J	0.52	2.6
Barium		31.8	J	0.14	0.66
Beryllium		0.19	J	0.037	0.26
Cadmium		0.21	J	0.039	0.26
Calcium		86800	J B	4.3	65.5
Chromium		9.1	J	0.26	0.66
Cobalt		3.4		0.066	0.66
Copper		7.3		0.28	1.3
Iron		7060	J B	1.4	13.1
Lead		8.4	J	0.31	1.3
Magnesium		29100	B	1.2	26.2
Manganese		232		0.042	0.26
Nickel		8.0		0.30	6.6
Potassium		892	J	26.2	39.3
Selenium		ND		0.75	5.2
Silver		ND		0.26	0.66
Sodium		376		17.0	183
Thallium		ND		0.39	7.9
Vanadium		10.3	J	0.14	0.66
Zinc		40.0	J B	0.20	2.6

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.6095 g
Analysis Date:	08/06/2012 1505			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.014	J	0.0096	0.024

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (8-14)**

Lab Sample ID: 480-23453-3
Client Matrix: Solid

% Moisture: 12.7

Date Sampled: 08/02/2012 0840
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5397 g
Analysis Date:	08/07/2012 1422			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		7390	J	4.7	10.6
Antimony		ND		0.57	15.9
Arsenic		5.9		0.42	2.1
Barium		61.8	J	0.12	0.53
Beryllium		0.42		0.030	0.21
Cadmium		0.26		0.032	0.21
Calcium		65000	J B	3.5	53.1
Chromium		18.9	J	0.21	0.53
Cobalt		7.5		0.053	0.53
Copper		18.7		0.22	1.1
Iron		15400	J B	1.2	10.6
Lead		83.0	J	0.25	1.1
Magnesium		13200	B	0.98	21.2
Manganese		317		0.034	0.21
Nickel		19.3		0.24	5.3
Potassium		1360	J	21.2	31.8
Selenium		ND		0.60	4.2
Silver		ND		0.21	0.53
Sodium		996		13.8	149
Thallium		ND		0.32	6.4
Vanadium		16.2	J	0.12	0.53
Zinc		94.6	J B	0.16	2.1

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.6286 g
Analysis Date:	08/06/2012 1507			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.20		0.0089	0.022

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-01 (20-22)**

Lab Sample ID: 480-23453-4
Client Matrix: Solid

% Moisture: 32.9

Date Sampled: 08/02/2012 0900
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5190 g
Analysis Date:	08/07/2012 1425			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		8690	J	6.3	14.4
Antimony		2.1	J	0.78	21.5
Arsenic		25.8		0.57	2.9
Barium		230	J	0.16	0.72
Beryllium		0.59		0.040	0.29
Cadmium		3.3		0.043	0.29
Calcium		35200	J B	4.7	71.8
Chromium		54.3	J	0.29	0.72
Cobalt		8.6		0.072	0.72
Copper		154		0.30	1.4
Iron		19500	J B	1.6	14.4
Lead		932	J	0.34	1.4
Magnesium		11600	B	1.3	28.7
Manganese		309		0.046	0.29
Nickel		37.9		0.33	7.2
Potassium		1120	J	28.7	43.1
Selenium		1.8	J	0.82	5.7
Silver		5.6		0.29	0.72
Sodium		2330		18.7	201
Thallium		0.52	J	0.43	8.6
Vanadium		19.5	J	0.16	0.72
Zinc		865	J B	0.22	2.9

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	10			Initial Weight/Volume:	.6317 g
Analysis Date:	08/06/2012 1544			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		4.4		0.11	0.28

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (8-10)**

Lab Sample ID: 480-23453-5
Client Matrix: Solid

% Moisture: 18.8

Date Sampled: 08/02/2012 1120
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5492 g
Analysis Date:	08/07/2012 1427			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		11600	J	4.9	11.2
Antimony		ND		0.61	16.8
Arsenic		4.9		0.45	2.2
Barium		78.6	J	0.12	0.56
Beryllium		0.58		0.031	0.22
Cadmium		0.24		0.034	0.22
Calcium		22900	J B	3.7	56.0
Chromium		17.8	J	0.22	0.56
Cobalt		11.0		0.056	0.56
Copper		18.4		0.24	1.1
Iron		18000	J B	1.2	11.2
Lead		19.3	J	0.27	1.1
Magnesium		11900	B	1.0	22.4
Manganese		374		0.036	0.22
Nickel		25.7		0.26	5.6
Potassium		1590	J	22.4	33.6
Selenium		ND		0.64	4.5
Silver		ND		0.22	0.56
Sodium		447		14.6	157
Thallium		ND		0.34	6.7
Vanadium		23.1	J	0.12	0.56
Zinc		77.4	J B	0.17	2.2

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	10			Initial Weight/Volume:	.5856 g
Analysis Date:	08/06/2012 1546			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		4.5		0.10	0.25

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-02 (18-21)**

Lab Sample ID: 480-23453-6
Client Matrix: Solid

% Moisture: 38.4

Date Sampled: 08/02/2012 1130
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5165 g
Analysis Date:	08/07/2012 1430			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		8780	J	6.9	15.7
Antimony		4.3	J	0.85	23.6
Arsenic		34.0		0.63	3.1
Barium		357	J	0.17	0.79
Beryllium		0.59		0.044	0.31
Cadmium		2.6		0.047	0.31
Calcium		18600	J B	5.2	78.6
Chromium		74.9	J	0.31	0.79
Cobalt		9.9		0.079	0.79
Copper		213		0.33	1.6
Iron		22100	J B	1.7	15.7
Lead		2640	J	0.38	1.6
Magnesium		8760	B	1.5	31.5
Manganese		297		0.050	0.31
Nickel		46.8		0.36	7.9
Potassium		1010	J	31.5	47.2
Selenium		2.1	J	0.90	6.3
Silver		4.1		0.31	0.79
Sodium		670		20.4	220
Thallium		ND		0.47	9.4
Vanadium		19.6	J	0.17	0.79
Zinc		1730	J B	0.24	3.1

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	10			Initial Weight/Volume:	.5901 g
Analysis Date:	08/06/2012 1548			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		6.4		0.13	0.33

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-01 (5-7)**

Lab Sample ID: 480-23453-7
Client Matrix: Solid

% Moisture: 12.8

Date Sampled: 08/02/2012 1530
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5086 g
Analysis Date:	08/07/2012 1446			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		5740	J	5.0	11.3
Antimony		ND		0.61	16.9
Arsenic		5.5		0.45	2.3
Barium		48.2	J	0.12	0.56
Beryllium		0.40		0.032	0.23
Cadmium		0.64		0.034	0.23
Calcium		75700	J B	3.7	56.4
Chromium		13.1	J	0.23	0.56
Cobalt		5.8		0.056	0.56
Copper		18.4		0.24	1.1
Iron		16000	J B	1.2	11.3
Lead		124	J	0.27	1.1
Magnesium		28100	B	1.0	22.6
Manganese		496		0.036	0.23
Nickel		14.6		0.26	5.6
Potassium		1000	J	22.6	33.8
Selenium		ND		0.64	4.5
Silver		ND		0.23	0.56
Sodium		359		14.7	158
Thallium		ND		0.34	6.8
Vanadium		17.8	J	0.12	0.56
Zinc		168	J B	0.17	2.3

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.6138 g
Analysis Date:	08/06/2012 1523			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.055		0.0091	0.022

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AW-01 (20-22.5)**

Lab Sample ID: 480-23453-8
Client Matrix: Solid

% Moisture: 23.6

Date Sampled: 08/02/2012 1540
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5276 g
Analysis Date:	08/07/2012 1448			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		9960	J	5.5	12.4
Antimony		ND		0.67	18.6
Arsenic		4.9		0.50	2.5
Barium		77.2	J	0.14	0.62
Beryllium		0.50		0.035	0.25
Cadmium		0.22	J	0.037	0.25
Calcium		37900	J B	4.1	62.0
Chromium		15.3	J	0.25	0.62
Cobalt		8.8		0.062	0.62
Copper		16.1		0.26	1.2
Iron		16000	J B	1.4	12.4
Lead		27.2	J	0.30	1.2
Magnesium		11800	B	1.2	24.8
Manganese		302		0.040	0.25
Nickel		19.9		0.29	6.2
Potassium		1500	J	24.8	37.2
Selenium		ND		0.71	5.0
Silver		ND		0.25	0.62
Sodium		451		16.1	174
Thallium		0.42	J	0.37	7.4
Vanadium		20.7	J	0.14	0.62
Zinc		59.7	J B	0.19	2.5

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.6610 g
Analysis Date:	08/06/2012 1525			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.096		0.0096	0.024

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **RB-080212**

Lab Sample ID: 480-23453-9
Client Matrix: Water

Date Sampled: 08/02/2012 1640
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75663	Instrument ID:	ICAP1
Prep Method:	3005A	Prep Batch:	480-75339	Lab File ID:	I1080712A-6.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/07/2012 1827			Final Weight/Volume:	50 mL
Prep Date:	08/07/2012 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	ND		0.060	0.20
Antimony	ND		0.0068	0.020
Arsenic	ND		0.0056	0.010
Barium	ND		0.00070	0.0020
Cadmium	ND		0.00050	0.0010
Calcium	0.23	J	0.10	0.50
Chromium	ND		0.0010	0.0040
Cobalt	ND		0.00063	0.0040
Copper	ND		0.0016	0.010
Iron	0.12	B	0.019	0.050
Lead	ND		0.0030	0.0050
Magnesium	0.053	J	0.043	0.20
Manganese	0.0016	J B	0.00040	0.0030
Nickel	ND		0.0013	0.010
Potassium	ND		0.10	0.50
Selenium	ND		0.0087	0.015
Silver	ND		0.0017	0.0030
Sodium	ND		0.32	1.0
Thallium	ND		0.010	0.020
Vanadium	ND		0.0015	0.0050
Zinc	ND		0.0015	0.010

Analysis Method:	6010B	Analysis Batch:	480-75827	Instrument ID:	ICAP2
Prep Method:	3005A	Prep Batch:	480-75339	Lab File ID:	I2080812A-8.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/08/2012 1919			Final Weight/Volume:	50 mL
Prep Date:	08/07/2012 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Beryllium	ND		0.00030	0.0020

7470A Mercury (CVAA)

Analysis Method:	7470A	Analysis Batch:	480-75731	Instrument ID:	LEEMAN2
Prep Method:	7470A	Prep Batch:	480-75645	Lab File ID:	H08082W1.PRN
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	08/08/2012 1241			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 0910				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Mercury	ND		0.00012	0.00020

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (10-12)**

Lab Sample ID: 480-23453-10
Client Matrix: Solid

% Moisture: 20.0

Date Sampled: 08/03/2012 0920
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4874 g
Analysis Date:	08/07/2012 1451			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		7550	J	5.6	12.8
Antimony		ND		0.69	19.2
Arsenic		4.7		0.51	2.6
Barium		56.0	J	0.14	0.64
Beryllium		0.61		0.036	0.26
Cadmium		0.35		0.038	0.26
Calcium		11200	J B	4.2	64.1
Chromium		13.4	J	0.26	0.64
Cobalt		7.7		0.064	0.64
Copper		25.4		0.27	1.3
Iron		14800	J B	1.4	12.8
Lead		43.3	J	0.31	1.3
Magnesium		4710	B	1.2	25.6
Manganese		203		0.041	0.26
Nickel		23.3		0.29	6.4
Potassium		606	J	25.6	38.5
Selenium		ND		0.73	5.1
Silver		ND		0.26	0.64
Sodium		546		16.7	179
Thallium		ND		0.38	7.7
Vanadium		19.5	J	0.14	0.64
Zinc		73.7	J B	0.20	2.6

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.6228 g
Analysis Date:	08/06/2012 1526			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.034		0.0098	0.024

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **DUP-080212**

Lab Sample ID: 480-23453-12
Client Matrix: Solid

% Moisture: 8.1

Date Sampled: 08/02/2012 0000
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4985 g
Analysis Date:	08/07/2012 1453			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		5200	J	4.8	10.9
Antimony		ND		0.59	16.4
Arsenic		4.8		0.44	2.2
Barium		47.2	J	0.12	0.55
Beryllium		0.51		0.031	0.22
Cadmium		0.35		0.033	0.22
Calcium		75100	J B	3.6	54.5
Chromium		10.7	J	0.22	0.55
Cobalt		4.6		0.055	0.55
Copper		18.7		0.23	1.1
Iron		12700	J B	1.2	10.9
Lead		93.0	J	0.26	1.1
Manganese		341		0.035	0.22
Nickel		14.8		0.25	5.5
Potassium		848	J	21.8	32.7
Selenium		1.2	J	0.62	4.4
Silver		ND		0.22	0.55
Sodium		305		14.2	153
Thallium		ND		0.33	6.5
Vanadium		11.4	J	0.12	0.55
Zinc		84.2	J B	0.17	2.2

Analysis Method:	6010B	Analysis Batch:	480-76551	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I2081412A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4985 g
Analysis Date:	08/14/2012 1616			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Magnesium		30700	B	1.0	21.8

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.5960 g
Analysis Date:	08/06/2012 1528			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.074		0.0089	0.022

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-04 (18-21)**

Lab Sample ID: 480-23453-13
Client Matrix: Solid

% Moisture: 16.0

Date Sampled: 08/03/2012 0930
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5036 g
Analysis Date:	08/07/2012 1456			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		6450	J	5.2	11.8
Antimony		ND		0.64	17.7
Arsenic		2.1	J	0.47	2.4
Barium		75.2	J	0.13	0.59
Beryllium		0.32		0.033	0.24
Cadmium		0.24		0.035	0.24
Calcium		60000	J B	3.9	59.1
Chromium		10.5	J	0.24	0.59
Cobalt		5.6		0.059	0.59
Copper		13.0		0.25	1.2
Iron		11000	J B	1.3	11.8
Lead		13.4	J	0.28	1.2
Magnesium		26700	B	1.1	23.6
Manganese		420		0.038	0.24
Nickel		12.8		0.27	5.9
Potassium		1310	J	23.6	35.5
Selenium		ND		0.67	4.7
Silver		ND		0.24	0.59
Sodium		403		15.4	165
Thallium		ND		0.35	7.1
Vanadium		15.2	J	0.13	0.59
Zinc		49.9	J B	0.18	2.4

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.6604 g
Analysis Date:	08/06/2012 1530			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND		0.0088	0.022

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (8-10)**

Lab Sample ID: 480-23453-14
Client Matrix: Solid

% Moisture: 17.4

Date Sampled: 08/03/2012 1200
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4913 g
Analysis Date:	08/07/2012 1458			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		6500	J	5.4	12.3
Antimony		ND		0.66	18.5
Arsenic		4.9		0.49	2.5
Barium		57.6	J	0.14	0.62
Beryllium		0.36		0.034	0.25
Cadmium		0.30		0.037	0.25
Calcium		107000	J B	4.1	61.6
Chromium		14.8	J	0.25	0.62
Cobalt		6.3		0.062	0.62
Copper		18.2		0.26	1.2
Iron		21400	J B	1.4	12.3
Lead		54.2	J	0.30	1.2
Manganese		443		0.039	0.25
Nickel		17.3		0.28	6.2
Potassium		1730	J	24.6	36.9
Selenium		ND		0.70	4.9
Silver		ND		0.25	0.62
Sodium		1400		16.0	172
Thallium		ND		0.37	7.4
Vanadium		14.7	J	0.14	0.62
Zinc		165	J B	0.19	2.5

Analysis Method:	6010B	Analysis Batch:	480-76551	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I2081412A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4913 g
Analysis Date:	08/14/2012 1618			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Magnesium		49300	B	1.1	24.6

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.6625 g
Analysis Date:	08/06/2012 1531			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.16		0.0089	0.022

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-02 (20-22)**

Lab Sample ID: 480-23453-15
Client Matrix: Solid

% Moisture: 22.2

Date Sampled: 08/03/2012 1210
Date Received: 08/03/2012 1500

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75658	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75316	Lab File ID:	I1080712A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4825 g
Analysis Date:	08/07/2012 1505			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1820				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		11600	J	5.9	13.3
Antimony		ND		0.72	20.0
Arsenic		6.0		0.53	2.7
Barium		70.9	J	0.15	0.67
Beryllium		0.55		0.037	0.27
Cadmium		0.27		0.040	0.27
Calcium		69400	J B	4.4	66.6
Chromium		16.1	J	0.27	0.67
Cobalt		10.1		0.067	0.67
Copper		18.5		0.28	1.3
Iron		18200	J B	1.5	13.3
Lead		23.7	J	0.32	1.3
Magnesium		25900	B	1.2	26.7
Manganese		534		0.043	0.27
Nickel		23.8		0.31	6.7
Potassium		2690	J	26.7	40.0
Selenium		ND		0.76	5.3
Silver		ND		0.27	0.67
Sodium		649		17.3	187
Thallium		ND		0.40	8.0
Vanadium		22.5	J	0.15	0.67
Zinc		64.6	J B	0.20	2.7

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75362	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75233	Lab File ID:	J08062S2.PRN
Dilution:	1.0			Initial Weight/Volume:	.5906 g
Analysis Date:	08/06/2012 1533			Final Weight/Volume:	50 mL
Prep Date:	08/06/2012 1035				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.015	J	0.011	0.026

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-03 (8-10)**

Lab Sample ID: 480-23564-1
Client Matrix: Solid

% Moisture: 6.8

Date Sampled: 08/06/2012 1050
Date Received: 08/07/2012 1330

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75842	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75650	Lab File ID:	I1080812A-4.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4654 g
Analysis Date:	08/08/2012 1852			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 1100				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		3300	J	5.1	11.5
Antimony		0.72	J	0.62	17.3
Arsenic		4.7		0.46	2.3
Barium		45.9	J	0.13	0.58
Beryllium		0.26		0.032	0.23
Cadmium		0.27		0.035	0.23
Chromium		10.6	J	0.23	0.58
Cobalt		3.3		0.058	0.58
Copper		26.9		0.24	1.2
Iron		13500	J	1.3	11.5
Lead		148	J	0.28	1.2
Magnesium		23400		1.1	23.1
Manganese		250	B	0.037	0.23
Nickel		11.2		0.27	5.8
Potassium		764	J	23.1	34.6
Selenium		ND		0.66	4.6
Silver		ND		0.23	0.58
Sodium		1090	B	15.0	161
Thallium		0.40	J	0.35	6.9
Vanadium		8.4	J	0.13	0.58
Zinc		137	J B	0.18	2.3

Analysis Method:	6010B	Analysis Batch:	480-76024	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-75650	Lab File ID:	I2080912A-7.asc
Dilution:	5.0			Initial Weight/Volume:	+0.4654 g
Analysis Date:	08/09/2012 2035			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 1100				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Calcium		152000	J B	19.0	288

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75725	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75636	Lab File ID:	J08082S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.6164 g
Analysis Date:	08/08/2012 1229			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 0830				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.21		0.0085	0.021

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-03- (20-22.5)**

Lab Sample ID: 480-23564-2
Client Matrix: Solid

% Moisture: 18.9

Date Sampled: 08/06/2012 1100
Date Received: 08/07/2012 1330

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75842	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75650	Lab File ID:	I1080812A-4.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5235 g
Analysis Date:	08/08/2012 1904			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 1100				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		11700	J	5.2	11.8
Antimony		ND		0.64	17.7
Arsenic		4.7		0.47	2.4
Barium		99.3	J	0.13	0.59
Beryllium		0.61		0.033	0.24
Cadmium		0.22	J	0.035	0.24
Calcium		48900	J B	3.9	58.9
Chromium		17.2	J	0.24	0.59
Cobalt		9.6		0.059	0.59
Copper		18.7		0.25	1.2
Iron		18000	J	1.3	11.8
Lead		22.7	J	0.28	1.2
Magnesium		18200		1.1	23.5
Manganese		407	B	0.038	0.24
Nickel		22.5		0.27	5.9
Potassium		2440	J	23.5	35.3
Selenium		ND		0.67	4.7
Silver		ND		0.24	0.59
Sodium		1220	B	15.3	165
Thallium		0.35	J	0.35	7.1
Vanadium		23.6	J	0.13	0.59
Zinc		63.6	J B	0.18	2.4

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75725	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75636	Lab File ID:	J08082S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.6121 g
Analysis Date:	08/08/2012 1231			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 0830				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.046		0.0098	0.024

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (8-11)**

Lab Sample ID: 480-23564-3
Client Matrix: Solid

% Moisture: 21.8

Date Sampled: 08/06/2012 1430
Date Received: 08/07/2012 1330

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75842	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75650	Lab File ID:	I1080812A-4.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4641 g
Analysis Date:	08/08/2012 1907			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 1100				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		8520	J	6.1	13.8
Antimony		ND		0.74	20.7
Arsenic		3.1		0.55	2.8
Barium		53.1	J	0.15	0.69
Beryllium		0.54		0.039	0.28
Cadmium		0.34		0.041	0.28
Calcium		3670	J B	4.5	68.9
Chromium		13.4	J	0.28	0.69
Cobalt		9.4		0.069	0.69
Copper		23.3		0.29	1.4
Iron		21800	J	1.5	13.8
Lead		14.5	J	0.33	1.4
Magnesium		3640		1.3	27.6
Manganese		243	B	0.044	0.28
Nickel		25.6		0.32	6.9
Potassium		976	J	27.6	41.4
Selenium		ND		0.79	5.5
Silver		ND		0.28	0.69
Sodium		343	B	17.9	193
Thallium		ND		0.41	8.3
Vanadium		17.3	J	0.15	0.69
Zinc		71.5	J B	0.21	2.8

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75725	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75636	Lab File ID:	J08082S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.6183 g
Analysis Date:	08/08/2012 1233			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 0830				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.031		0.010	0.025

Client: ARCADIS U.S. Inc

Job Number: 480-23453-1

Client Sample ID: **AB-C2 (22-24)**

Lab Sample ID: 480-23564-4
Client Matrix: Solid

% Moisture: 9.1

Date Sampled: 08/06/2012 1440
Date Received: 08/07/2012 1330

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-75842	Instrument ID:	ICAP1
Prep Method:	3050B	Prep Batch:	480-75650	Lab File ID:	I1080812A-4.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4918 g
Analysis Date:	08/08/2012 1909			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 1100				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		2290	J	4.9	11.2
Antimony		ND		0.60	16.8
Arsenic		2.7		0.45	2.2
Barium		23.5	J	0.12	0.56
Beryllium		0.13	J	0.031	0.22
Cadmium		0.27		0.034	0.22
Chromium		5.1	J	0.22	0.56
Cobalt		2.4		0.056	0.56
Copper		5.6		0.24	1.1
Iron		5740	J	1.2	11.2
Lead		4.7	J	0.27	1.1
Manganese		187	B	0.036	0.22
Nickel		5.8		0.26	5.6
Potassium		724	J	22.4	33.6
Selenium		ND		0.64	4.5
Silver		ND		0.22	0.56
Sodium		248	B	14.5	157
Thallium		ND		0.34	6.7
Vanadium		7.8	J	0.12	0.56
Zinc		68.1	J B	0.17	2.2

Analysis Method:	6010B	Analysis Batch:	480-76123	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-75650	Lab File ID:	I2081012A-2.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4918 g
Analysis Date:	08/10/2012 1223			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 1100				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Calcium		106000	J B	3.7	56.0
Magnesium		26300		1.0	22.4

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-75725	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-75636	Lab File ID:	J08082S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.5958 g
Analysis Date:	08/08/2012 1235			Final Weight/Volume:	50 mL
Prep Date:	08/08/2012 0830				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.018	J	0.0090	0.022

General Chemistry

Client Sample ID: **AB-05 (9.5-10.8)**

Lab Sample ID: 480-23453-1
Client Matrix: Solid

% Moisture: 20.4

Date Sampled: 08/01/2012 1440
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.51	1.1	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0818						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	0.46	J B	mg/Kg	0.13	0.59	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	20		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	80		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AB-05 (22-25)**

Lab Sample ID: 480-23453-2
Client Matrix: Solid

% Moisture: 17.0

Date Sampled: 08/01/2012 1450
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.53	1.1	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0819						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	ND		mg/Kg	0.12	0.55	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	17		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	83		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AB-01 (8-14)**

Lab Sample ID: 480-23453-3
Client Matrix: Solid
% Moisture: 12.7
Date Sampled: 08/02/2012 0840
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	0.62	J	mg/Kg	0.55	1.1	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0819						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	0.12	J B	mg/Kg	0.12	0.53	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	13		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	87		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AB-01 (20-22)**

Lab Sample ID: 480-23453-4
Client Matrix: Solid
% Moisture: 32.9
Date Sampled: 08/02/2012 0900
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	1.6		mg/Kg	0.62	1.3	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0820						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	0.24	J B	mg/Kg	0.16	0.69	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	33		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	67		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AW-02 (8-10)**

Lab Sample ID: 480-23453-5
Client Matrix: Solid
% Moisture: 18.8

Date Sampled: 08/02/2012 1120
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.56	1.2	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0821						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	1.3	B	mg/Kg	0.13	0.58	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	19		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	81		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AW-02 (18-21)**

Lab Sample ID: 480-23453-6
Client Matrix: Solid
% Moisture: 38.4

Date Sampled: 08/02/2012 1130
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	1.5		mg/Kg	0.70	1.5	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0822						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	1.7	B	mg/Kg	0.18	0.77	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	38		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	62		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AW-01 (5-7)**

Lab Sample ID: 480-23453-7

Client Matrix: Solid

% Moisture: 12.8

Date Sampled: 08/02/2012 1530

Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	1.2		mg/Kg	0.53	1.1	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0825						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	0.42	J B	mg/Kg	0.12	0.53	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	13		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	87		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AW-01 (20-22.5)**

Lab Sample ID: 480-23453-8
Client Matrix: Solid

% Moisture: 23.6

Date Sampled: 08/02/2012 1540
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.60	1.2	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0826						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	0.34	J B	mg/Kg	0.14	0.60	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	24		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	76		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: RB-080212

Lab Sample ID: 480-23453-9
Client Matrix: Water

Date Sampled: 08/02/2012 1640
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	ND		mg/L	0.0050	0.020	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0849						
Prep Batch: 480-75393	Prep Date: 08/07/2012 0222						
Cyanide, Free	ND		ug/L	0.54	5.0	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						
Prep Batch: 460-123268	Prep Date: 08/08/2012 0600						

General Chemistry

Client Sample ID: **AB-04 (10-12)**

Lab Sample ID: 480-23453-10
Client Matrix: Solid

% Moisture: 20.0

Date Sampled: 08/03/2012 0920
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.51	1.1	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0827						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	0.71	B	mg/Kg	0.13	0.57	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	20		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	80		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **DUP-080212**

Lab Sample ID: 480-23453-12
Client Matrix: Solid

% Moisture: 8.1

Date Sampled: 08/02/2012 0000
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	0.63	J	mg/Kg	0.45	0.92	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0828						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	ND		mg/Kg	0.11	0.49	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	8.1		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	92		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AB-04 (18-21)**

Lab Sample ID: 480-23453-13
Client Matrix: Solid
% Moisture: 16.0

Date Sampled: 08/03/2012 0930
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.56	1.2	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0829						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	ND		mg/Kg	0.13	0.56	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	16		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	84		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AB-02 (8-10)**

Lab Sample ID: 480-23453-14
Client Matrix: Solid

% Moisture: 17.4

Date Sampled: 08/03/2012 1200
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.52	1.1	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0830						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	0.13	J B	mg/Kg	0.13	0.56	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	17		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	83		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AB-02 (20-22)**

Lab Sample ID: 480-23453-15
Client Matrix: Solid
% Moisture: 22.2

Date Sampled: 08/03/2012 1210
Date Received: 08/03/2012 1500

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.54	1.1	1.0	9012A
Analysis Batch: 480-75433	Analysis Date: 08/07/2012 0831						DryWt Corrected: Y
Prep Batch: 480-75389	Prep Date: 08/06/2012 2020						
Cyanide, Free	0.87	B	mg/Kg	0.14	0.60	1.0	9016
Analysis Batch: 460-123275	Analysis Date: 08/08/2012 1200						DryWt Corrected: Y
Prep Batch: 460-123264	Prep Date: 08/08/2012 0600						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	22		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N
Percent Solids	78		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75317	Analysis Date: 08/06/2012 1351						DryWt Corrected: N

General Chemistry

Client Sample ID: **AB-03 (8-10)**

Lab Sample ID: 480-23564-1
Client Matrix: Solid

% Moisture: 6.8

Date Sampled: 08/06/2012 1050
Date Received: 08/07/2012 1330

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.49	1.0	1.0	9012A
Analysis Batch: 480-75997	Analysis Date: 08/10/2012 0314						DryWt Corrected: Y
Prep Batch: 480-75977	Prep Date: 08/09/2012 1520						
Cyanide, Free	0.53	U B	mg/Kg	0.11	0.45	1.0	9016
Analysis Batch: 460-124138	Analysis Date: 08/14/2012 1430						DryWt Corrected: Y
Prep Batch: 460-124135	Prep Date: 08/14/2012 0830						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	6.8		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75878	Analysis Date: 08/09/2012 1037						DryWt Corrected: N
Percent Solids	93		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75878	Analysis Date: 08/09/2012 1037						DryWt Corrected: N

General Chemistry

Client Sample ID: **AB-03- (20-22.5)**

Lab Sample ID: 480-23564-2
Client Matrix: Solid

% Moisture: 18.9

Date Sampled: 08/06/2012 1100
Date Received: 08/07/2012 1330

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.58	1.2	1.0	9012A
Analysis Batch: 480-75997	Analysis Date: 08/10/2012 0315						DryWt Corrected: Y
Prep Batch: 480-75977	Prep Date: 08/09/2012 1520						
Cyanide, Free	0.62	U B	mg/Kg	0.13	0.53	1.0	9016
Analysis Batch: 460-124138	Analysis Date: 08/14/2012 1430						DryWt Corrected: Y
Prep Batch: 460-124135	Prep Date: 08/14/2012 0830						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	19		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75878	Analysis Date: 08/09/2012 1037						DryWt Corrected: N
Percent Solids	81		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75878	Analysis Date: 08/09/2012 1037						DryWt Corrected: N

General Chemistry

Client Sample ID: **AB-C2 (8-11)**

Lab Sample ID: 480-23564-3
Client Matrix: Solid

% Moisture: 21.8

Date Sampled: 08/06/2012 1430
Date Received: 08/07/2012 1330

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.57	1.2	1.0	9012A
Analysis Batch: 480-75997	Analysis Date: 08/10/2012 0316						DryWt Corrected: Y
Prep Batch: 480-75977	Prep Date: 08/09/2012 1520						
Cyanide, Free	0.93	B	mg/Kg	0.13	0.54	1.0	9016
Analysis Batch: 460-124138	Analysis Date: 08/14/2012 1430						DryWt Corrected: Y
Prep Batch: 460-124135	Prep Date: 08/14/2012 0830						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	22		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75878	Analysis Date: 08/09/2012 1037						DryWt Corrected: N
Percent Solids	78		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75878	Analysis Date: 08/09/2012 1037						DryWt Corrected: N

General Chemistry

Client Sample ID: AB-C2 (22-24)

Lab Sample ID: 480-23564-4

Client Matrix: Solid

% Moisture: 9.1

Date Sampled: 08/06/2012 1440

Date Received: 08/07/2012 1330

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	ND		mg/Kg	0.49	1.0	1.0	9012A
Analysis Batch: 480-75997	Analysis Date: 08/10/2012 0316						DryWt Corrected: Y
Prep Batch: 480-75977	Prep Date: 08/09/2012 1520						
Cyanide, Free	0.69	J B	mg/Kg	0.12	0.48	1.0	9016
Analysis Batch: 460-124138	Analysis Date: 08/14/2012 1430						DryWt Corrected: Y
Prep Batch: 460-124135	Prep Date: 08/14/2012 0830						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	9.1		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75878	Analysis Date: 08/09/2012 1037						DryWt Corrected: N
Percent Solids	91		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-75878	Analysis Date: 08/09/2012 1037						DryWt Corrected: N

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Data Usability Summary Report (DUSR)

BUFFALO, NEW YORK

Volatile, Semivolatile, Metals, and Miscellaneous Analyses

SDG #480-30911-1

Analyses Performed By:
TestAmerica Laboratories
Buffalo, New York

Report #18847R
Review Level: Tier III
Project: B0023310.0000.00001

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #480-30911-1 for samples collected in association with the National Fuel Wilkenson Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
AW-04	309111	Water	12/28/2012		X	X		X	X
AW-03	309112	Water	12/28/2012		X	X		X	X
DUP	309113	Water	12/28/2012	AW-03	X	X		X	X
TRIP BLANK	309114	Water	12/28/2012		X				

Note:

1. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location AW-04.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 8260B and 8270C as referenced in NYSDEC-ASP. Data were reviewed in accordance with USEPA Region II SOP HW-24 - Validating Volatile Organic Compounds by SW-846 Method 8260B of October 2006 and New York State ASP 2005.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of less than 2 s.u.
	Soil	48 hours from collection to extraction and 14 days from extraction to analysis	Cool to 4°C±2°C.

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
AW-04 AW-03 DUP TRIP BLANK	CCV %D	Cyclohexane	+39.4%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 15% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD >90%	Non-detect	R
		Detect	J
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC

analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD exhibited acceptable recoveries and RPD between the MS/MSD recoveries.

8. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-03/ DUP	Benzene	12	12	0.0 %
	Methylene Chloride	4.3 J	3 J	AC

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks					X
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate(LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS)		X		X	
Matrix Spike Duplicate(MSD)		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content					X
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
E. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cooled @ 4°C ± 2°C
	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cooled @ 4°C ± 2°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.3 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.4 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
AW-04	CCV %D	2-Methylphenol	-21.5%
		4-Nitrophenol	46.2%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 15% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD >90%	Non-detect	R
		Detect	J
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC

analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
AW-04	2,4-Dimethylphenol	>UL	>UL
	2-Nitroaniline	>UL	>UL
	Caprolactam	<LL but >10%	<LL but >10%

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

8. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery
AW-04 AW-03 DUP	2-Nitroaniline	> UL
	4-Chloro-3-methylphenol	> UL
	Acetophenone	> UL
	Caprolactam	< LL but > 10%

The criteria used to evaluate the LCS recoveries are presented in the following table. In the case of an LCS deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-03/ DUP	2-Methylnaphthalene	39	41	5.0 %
	Acenaphthene	81	80	1.2 %
	Acenaphthylene	0.78 J	0.75 J	AC
	Acetophenone	5 U	0.96 J	AC
	Anthracene	7.9	8.3	AC

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
	Biphenyl	4.5 J	4.4 J	AC
	Carbazole	10	11	AC
	Dibenzofuran	41	40	2.4%
	Fluoranthene	6.7	6.6	AC
	Fluorene	47	45	4.3%
	Naphthalene	4.9 J	4.6 J	AC
	Phenanthrene	45	46	2.1%
	Pyrene	3.7 J	3.6 J	AC

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X	X		
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate(MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Quantitation transcriptions/calculations		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6000/7000 and 9012A/9016. Data were reviewed in accordance with USEPA National Functional Guidelines of July 2002.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

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METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010B	Water	180 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to 4°C±2°C.
SW-846 7470	Water	28 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool to 4°C±2°C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. Therefore, sample results greater than the BAL resulted in the removal of the laboratory qualifier (B). No other qualification of the sample results was required.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All CRDL standard recoveries were within control limits.

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS recovery control limits do not apply for MS performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD analysis exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
AW-03/ DUP	Arsenic	0.0085 J	0.0058 J	AC
	Barium	0.094	0.094	0.0%
	Calcium	373	372	0.2%
	Chromium	0.0025 J	0.0028 J	AC
	Cobalt	0.00068 J	0.004 U	AC
	Copper	0.0024 J	0.01 U	AC
	Iron	15.5	15.4	0.6%
	Magnesium	23	22.8	0.8%
	Manganese	1.4	1.4	0.0%
	Potassium	11.4	11.2	1.7%
	Sodium	352	351	0.2%
	Vanadium	0.0036 J	0.0037 J	AC
	Zinc	0.0024 J	0.0024 J	AC

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution exhibited %D within the control limit.

8.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in

this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6000/7000	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP) Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X	X		
B. Method Blanks		X		X	
C. Equipment/Field Blanks					X
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution		X		X	
Reporting Limit Verification		X		X	
Raw Data		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard		X		X	
ICP Interference Check		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%R Percent recovery
RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Cyanide by SW-846 9012/9016	Water	14 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of greater than 12.
	Soil		Cool to 4°C±2°C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all initial calibration verification standard recoveries were within control limits.

All calibration standard recoveries were within the control limit.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.3 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the

analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analyte present in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
AW-04	Cyanide, Total	> 125	> 125

UL = Upper control limit

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to the parent sample result associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
	Detect	J
MS/MSD percent recovery <30%	Non-detect	R
	Detect	J
MS/MSD percent recovery >125%	Non-detect	No Action
	Detect	J

4.4 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
AW-03/ DUP	Cyanide, Total -9012A	0.11	0.093	16.7%
	Cyanide, Free	5 U	1.6 J	AC

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: EPA XXXX	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
F. Method blanks		X		X	
G. Equipment blanks					X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate(MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Moisture Content					X
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data					
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference

SAMPLE COMPLIANCE REPORT

Sample Delivery Group (SDG)	Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
					VOC	SVOC	PCB	MET	MISC	
480-30911-1	12/28/2012	SW846	AW-04	Water	Yes	No	--	Yes	No	SVOC-CCAL %D, LCS %R, MS/MSD %R Misc. – MS/MSD %R
	12/28/2012	SW846	AW-03	Water	Yes	No	--	Yes	Yes	SVOC-LCS %R
	12/28/2012	SW846	DUP	Water	Yes	No	--	Yes	Yes	SVOC-LCS %R
	12/28/2012	SW846	TRIP BLANK	Water	Yes	--	--	--	--	

1 Samples which are compliant with no added validation qualifiers are listed as "yes". Samples which are non-compliant or which have added qualifiers are listed as "no". A "no" designation does not necessarily indicate that the data have been rejected or are otherwise unusable.

VALIDATION PERFORMED BY: Todd Church

SIGNATURE: 

DATE: March 26, 2013

PEER REVIEW: Dennis Capria

DATE: April 1, 2013

CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☒

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client	Project Manager	Date	Chain of Custody Number
ARCADIS	BRAD WALKER	12/28/12	218757
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
50 FOUNTAIN PLAZA SUITE 600	716-667-0900 / 716-		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
BUFFALO / NY / 14202	ADAM LAVELLE	MELISSA DEYO	
Project Name and Location (State)	**Carrier/Waybill Number**		
NATIONAL FUEL, FOURTH ST, BUFFALO, NY	DELIVERY		
Contract/Purchase Order/Quote No.			
B0023310.0000.00001			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: 9016-Cyanide, Free	6010B, 7470A	8260B - TCL VOC	8270C - TCL SVOC	9012A - Cyanide, Total
AW-04	12/28/12	1510		X			2		1	3	2		1	1	3	2	1
AW-04 MS	12/28/12	1510		X			2		1	3	2		1	1	3	2	1
AW-04 MSD	12/28/12	1510		X			2		1	3	2		1	1	3	2	1
AW-03	12/28/12	1445		X			2		1	3	2		1	1	3	2	1
DUP	12/28/12	1445		X			2		1	3	2		1	1	3	2	1

Special Instructions/ Conditions of Receipt

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☒ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Relinquished By	Date	Time	Received By	Date	Time
1.	Adam Lavelle	12/28/12	1625	TAB Buffalo	12/28/12	1625
2.						
3.						

Comments

2.4, 1.9 AZ

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **AW-04**

Lab Sample ID: 480-30911-1
Client Matrix: Water

Date Sampled: 12/28/2012 1510
Date Received: 12/28/2012 1625

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-98011	Instrument ID:	HP5973C
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	C25891.D
Dilution:	5.0			Initial Weight/Volume:	5 mL
Analysis Date:	01/02/2013 2001			Final Weight/Volume:	5 mL
Prep Date:	01/02/2013 2001				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		4.1	5.0
1,1,2,2-Tetrachloroethane	ND		1.1	5.0
1,1,2-Trichloroethane	ND		1.2	5.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.6	5.0
1,1-Dichloroethane	ND		1.9	5.0
1,1-Dichloroethene	ND		1.5	5.0
1,2,4-Trichlorobenzene	ND		2.1	5.0
1,2-Dibromo-3-Chloropropane	ND		2.0	5.0
1,2-Dibromoethane	ND		3.7	5.0
1,2-Dichlorobenzene	ND		4.0	5.0
1,2-Dichloroethane	ND		1.1	5.0
1,2-Dichloropropane	ND		3.6	5.0
1,3-Dichlorobenzene	ND		3.9	5.0
1,4-Dichlorobenzene	ND		4.2	5.0
2-Hexanone	ND		6.2	25
2-Butanone (MEK)	ND		6.6	50
4-Methyl-2-pentanone (MIBK)	ND		11	25
Acetone	ND		15	50
Benzene	170		2.1	5.0
Bromodichloromethane	ND		2.0	5.0
Bromoform	ND		1.3	5.0
Bromomethane	ND		3.5	5.0
Carbon disulfide	ND		0.95	5.0
Carbon tetrachloride	ND		1.4	5.0
Chlorobenzene	ND		3.8	5.0
Dibromochloromethane	ND		1.6	5.0
Chloroethane	ND		1.6	5.0
Chloroform	ND		1.7	5.0
Chloromethane	ND		1.8	5.0
cis-1,2-Dichloroethene	ND		4.1	5.0
cis-1,3-Dichloropropene	ND		1.8	5.0
Cyclohexane	ND		0.90	5.0
Dichlorodifluoromethane	ND		3.4	5.0
Ethylbenzene	4.0	J	3.7	5.0
Isopropylbenzene	ND		4.0	5.0
Methyl acetate	ND		2.5	5.0
Methyl tert-butyl ether	ND		0.80	5.0
Methylcyclohexane	ND		0.80	5.0
Methylene Chloride	ND		2.2	5.0
Styrene	ND		3.7	5.0
Tetrachloroethene	ND		1.8	5.0
Toluene	ND		2.6	5.0
trans-1,2-Dichloroethene	ND		4.5	5.0
trans-1,3-Dichloropropene	ND		1.9	5.0
Trichloroethene	ND		2.3	5.0
Trichlorofluoromethane	ND		4.4	5.0

Client: ARCADIS U.S. Inc | Job Number: 480-30911-1

Client Sample ID: **AW-04**

Lab Sample ID: 480-30911-1 | Date Sampled: 12/28/2012 1510
Client Matrix: Water | Date Received: 12/28/2012 1625

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-98011	Instrument ID:	HP5973C
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	C25891.D
Dilution:	5.0			Initial Weight/Volume:	5 mL
Analysis Date:	01/02/2013 2001			Final Weight/Volume:	5 mL
Prep Date:	01/02/2013 2001				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		4.5	5.0
Xylenes, Total	ND		3.3	10

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	78		66 - 137
Toluene-d8 (Surr)	79		71 - 126
4-Bromofluorobenzene (Surr)	82		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **AW-03**

Lab Sample ID: 480-30911-2
Client Matrix: Water

Date Sampled: 12/28/2012 1445
Date Received: 12/28/2012 1625

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-98011	Instrument ID:	HP5973C
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	C25894.D
Dilution:	5.0			Initial Weight/Volume:	5 mL
Analysis Date:	01/02/2013 2117			Final Weight/Volume:	5 mL
Prep Date:	01/02/2013 2117				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		4.1	5.0
1,1,2,2-Tetrachloroethane	ND		1.1	5.0
1,1,2-Trichloroethane	ND		1.2	5.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.6	5.0
1,1-Dichloroethane	ND		1.9	5.0
1,1-Dichloroethene	ND		1.5	5.0
1,2,4-Trichlorobenzene	ND		2.1	5.0
1,2-Dibromo-3-Chloropropane	ND		2.0	5.0
1,2-Dibromoethane	ND		3.7	5.0
1,2-Dichlorobenzene	ND		4.0	5.0
1,2-Dichloroethane	ND		1.1	5.0
1,2-Dichloropropane	ND		3.6	5.0
1,3-Dichlorobenzene	ND		3.9	5.0
1,4-Dichlorobenzene	ND		4.2	5.0
2-Hexanone	ND		6.2	25
2-Butanone (MEK)	ND		6.6	50
4-Methyl-2-pentanone (MIBK)	ND		11	25
Acetone	ND		15	50
Benzene	12		2.1	5.0
Bromodichloromethane	ND		2.0	5.0
Bromoform	ND		1.3	5.0
Bromomethane	ND		3.5	5.0
Carbon disulfide	ND		0.95	5.0
Carbon tetrachloride	ND		1.4	5.0
Chlorobenzene	ND		3.8	5.0
Dibromochloromethane	ND		1.6	5.0
Chloroethane	ND		1.6	5.0
Chloroform	ND		1.7	5.0
Chloromethane	ND		1.8	5.0
cis-1,2-Dichloroethene	ND		4.1	5.0
cis-1,3-Dichloropropene	ND		1.8	5.0
Cyclohexane	ND		0.90	5.0
Dichlorodifluoromethane	ND		3.4	5.0
Ethylbenzene	ND		3.7	5.0
Isopropylbenzene	ND		4.0	5.0
Methyl acetate	ND		2.5	5.0
Methyl tert-butyl ether	ND		0.80	5.0
Methylcyclohexane	ND		0.80	5.0
Methylene Chloride	4.3	J	2.2	5.0
Styrene	ND		3.7	5.0
Tetrachloroethene	ND		1.8	5.0
Toluene	ND		2.6	5.0
trans-1,2-Dichloroethene	ND		4.5	5.0
trans-1,3-Dichloropropene	ND		1.9	5.0
Trichloroethene	ND		2.3	5.0
Trichlorofluoromethane	ND		4.4	5.0

Client: ARCADIS U.S. Inc | Job Number: 480-30911-1

Client Sample ID: **AW-03**

Lab Sample ID: 480-30911-2 | Date Sampled: 12/28/2012 1445
Client Matrix: Water | Date Received: 12/28/2012 1625

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-98011	Instrument ID:	HP5973C
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	C25894.D
Dilution:	5.0			Initial Weight/Volume:	5 mL
Analysis Date:	01/02/2013 2117			Final Weight/Volume:	5 mL
Prep Date:	01/02/2013 2117				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		4.5	5.0
Xylenes, Total	ND		3.3	10

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	78		66 - 137
Toluene-d8 (Surr)	79		71 - 126
4-Bromofluorobenzene (Surr)	82		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **DUP**

Lab Sample ID: 480-30911-3
Client Matrix: Water

Date Sampled: 12/28/2012 1445
Date Received: 12/28/2012 1625

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-98011	Instrument ID:	HP5973C
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	C25895.D
Dilution:	5.0			Initial Weight/Volume:	5 mL
Analysis Date:	01/02/2013 2142			Final Weight/Volume:	5 mL
Prep Date:	01/02/2013 2142				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		4.1	5.0
1,1,2,2-Tetrachloroethane	ND		1.1	5.0
1,1,2-Trichloroethane	ND		1.2	5.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.6	5.0
1,1-Dichloroethane	ND		1.9	5.0
1,1-Dichloroethene	ND		1.5	5.0
1,2,4-Trichlorobenzene	ND		2.1	5.0
1,2-Dibromo-3-Chloropropane	ND		2.0	5.0
1,2-Dibromoethane	ND		3.7	5.0
1,2-Dichlorobenzene	ND		4.0	5.0
1,2-Dichloroethane	ND		1.1	5.0
1,2-Dichloropropane	ND		3.6	5.0
1,3-Dichlorobenzene	ND		3.9	5.0
1,4-Dichlorobenzene	ND		4.2	5.0
2-Hexanone	ND		6.2	25
2-Butanone (MEK)	ND		6.6	50
4-Methyl-2-pentanone (MIBK)	ND		11	25
Acetone	ND		15	50
Benzene	12		2.1	5.0
Bromodichloromethane	ND		2.0	5.0
Bromoform	ND		1.3	5.0
Bromomethane	ND		3.5	5.0
Carbon disulfide	ND		0.95	5.0
Carbon tetrachloride	ND		1.4	5.0
Chlorobenzene	ND		3.8	5.0
Dibromochloromethane	ND		1.6	5.0
Chloroethane	ND		1.6	5.0
Chloroform	ND		1.7	5.0
Chloromethane	ND		1.8	5.0
cis-1,2-Dichloroethene	ND		4.1	5.0
cis-1,3-Dichloropropene	ND		1.8	5.0
Cyclohexane	ND		0.90	5.0
Dichlorodifluoromethane	ND		3.4	5.0
Ethylbenzene	ND		3.7	5.0
Isopropylbenzene	ND		4.0	5.0
Methyl acetate	ND		2.5	5.0
Methyl tert-butyl ether	ND		0.80	5.0
Methylcyclohexane	ND		0.80	5.0
Methylene Chloride	3.0	J	2.2	5.0
Styrene	ND		3.7	5.0
Tetrachloroethene	ND		1.8	5.0
Toluene	ND		2.6	5.0
trans-1,2-Dichloroethene	ND		4.5	5.0
trans-1,3-Dichloropropene	ND		1.9	5.0
Trichloroethene	ND		2.3	5.0
Trichlorofluoromethane	ND		4.4	5.0

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **DUP**

Lab Sample ID: 480-30911-3
Client Matrix: Water

Date Sampled: 12/28/2012 1445
Date Received: 12/28/2012 1625

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-98011	Instrument ID:	HP5973C
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	C25895.D
Dilution:	5.0			Initial Weight/Volume:	5 mL
Analysis Date:	01/02/2013 2142			Final Weight/Volume:	5 mL
Prep Date:	01/02/2013 2142				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		4.5	5.0
Xylenes, Total	ND		3.3	10

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	76		66 - 137
Toluene-d8 (Surr)	78		71 - 126
4-Bromofluorobenzene (Surr)	81		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **TRIP BLANK**

Lab Sample ID: 480-30911-4
Client Matrix: Water

Date Sampled: 12/28/2012 0000
Date Received: 12/28/2012 1625

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-98011	Instrument ID:	HP5973C
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	C25896.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	01/02/2013 2207			Final Weight/Volume:	5 mL
Prep Date:	01/02/2013 2207				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		0.82	1.0
1,1,2,2-Tetrachloroethane	ND		0.21	1.0
1,1,2-Trichloroethane	ND		0.23	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.31	1.0
1,1-Dichloroethane	ND		0.38	1.0
1,1-Dichloroethene	ND		0.29	1.0
1,2,4-Trichlorobenzene	ND		0.41	1.0
1,2-Dibromo-3-Chloropropane	ND		0.39	1.0
1,2-Dibromoethane	ND		0.73	1.0
1,2-Dichlorobenzene	ND		0.79	1.0
1,2-Dichloroethane	ND		0.21	1.0
1,2-Dichloropropane	ND		0.72	1.0
1,3-Dichlorobenzene	ND		0.78	1.0
1,4-Dichlorobenzene	ND		0.84	1.0
2-Hexanone	ND		1.2	5.0
2-Butanone (MEK)	ND		1.3	10
4-Methyl-2-pentanone (MIBK)	ND		2.1	5.0
Acetone	ND		3.0	10
Benzene	ND		0.41	1.0
Bromodichloromethane	ND		0.39	1.0
Bromoform	ND		0.26	1.0
Bromomethane	ND		0.69	1.0
Carbon disulfide	ND		0.19	1.0
Carbon tetrachloride	ND		0.27	1.0
Chlorobenzene	ND		0.75	1.0
Dibromochloromethane	ND		0.32	1.0
Chloroethane	ND		0.32	1.0
Chloroform	ND		0.34	1.0
Chloromethane	ND		0.35	1.0
cis-1,2-Dichloroethene	ND		0.81	1.0
cis-1,3-Dichloropropene	ND		0.36	1.0
Cyclohexane	ND		0.18	1.0
Dichlorodifluoromethane	ND		0.68	1.0
Ethylbenzene	ND		0.74	1.0
Isopropylbenzene	ND		0.79	1.0
Methyl acetate	ND		0.50	1.0
Methyl tert-butyl ether	ND		0.16	1.0
Methylcyclohexane	ND		0.16	1.0
Methylene Chloride	ND		0.44	1.0
Styrene	ND		0.73	1.0
Tetrachloroethene	ND		0.36	1.0
Toluene	ND		0.51	1.0
trans-1,2-Dichloroethene	ND		0.90	1.0
trans-1,3-Dichloropropene	ND		0.37	1.0
Trichloroethene	ND		0.46	1.0
Trichlorofluoromethane	ND		0.88	1.0

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **TRIP BLANK**

Lab Sample ID: 480-30911-4
Client Matrix: Water

Date Sampled: 12/28/2012 0000
Date Received: 12/28/2012 1625

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-98011	Instrument ID:	HP5973C
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	C25896.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	01/02/2013 2207			Final Weight/Volume:	5 mL
Prep Date:	01/02/2013 2207				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		0.90	1.0
Xylenes, Total	ND		0.66	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	78		66 - 137
Toluene-d8 (Surr)	79		71 - 126
4-Bromofluorobenzene (Surr)	82		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **AW-04**

Lab Sample ID: 480-30911-1
Client Matrix: Water

Date Sampled: 12/28/2012 1510
Date Received: 12/28/2012 1625

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-97886	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-97788	Lab File ID:	X3444.D
Dilution:	1.0			Initial Weight/Volume:	1055 mL
Analysis Date:	12/31/2012 2304			Final Weight/Volume:	1 mL
Prep Date:	12/29/2012 0728			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Biphenyl	ND		0.62	4.7
bis (2-chloroisopropyl) ether	ND		0.49	4.7
2,4,5-Trichlorophenol	ND		0.45	4.7
2,4,6-Trichlorophenol	ND		0.58	4.7
2,4-Dichlorophenol	ND		0.48	4.7
2,4-Dimethylphenol	11	J	0.47	4.7
2,4-Dinitrophenol	ND		2.1	9.5
2,4-Dinitrotoluene	ND		0.42	4.7
2,6-Dinitrotoluene	ND		0.38	4.7
2-Chloronaphthalene	ND		0.44	4.7
2-Chlorophenol	ND		0.50	4.7
2-Methylnaphthalene	1.6	J	0.57	4.7
2-Methylphenol	ND	UJ	0.38	4.7
2-Nitroaniline	ND	*	0.40	9.5
2-Nitrophenol	ND		0.45	4.7
3,3'-Dichlorobenzidine	ND		0.38	4.7
3-Nitroaniline	ND		0.45	9.5
4,6-Dinitro-2-methylphenol	ND		2.1	9.5
4-Bromophenyl phenyl ether	ND		0.43	4.7
4-Chloro-3-methylphenol	ND	*	0.43	4.7
4-Chloroaniline	ND		0.56	4.7
4-Chlorophenyl phenyl ether	ND		0.33	4.7
4-Methylphenol	ND		0.34	9.5
4-Nitroaniline	ND		0.24	9.5
4-Nitrophenol	ND		1.4	9.5
Acenaphthene	1.9	J	0.39	4.7
Acenaphthylene	ND		0.36	4.7
Acetophenone	ND	*	0.51	4.7
Anthracene	ND		0.27	4.7
Atrazine	ND		0.44	4.7
Benzaldehyde	ND		0.25	4.7
Benzo(a)anthracene	ND		0.34	4.7
Benzo(a)pyrene	ND		0.45	4.7
Benzo(b)fluoranthene	ND		0.32	4.7
Benzo(g,h,i)perylene	ND		0.33	4.7
Benzo(k)fluoranthene	ND		0.69	4.7
Bis(2-chloroethoxy)methane	ND		0.33	4.7
Bis(2-chloroethyl)ether	ND		0.38	4.7
Bis(2-ethylhexyl) phthalate	ND		1.7	4.7
Butyl benzyl phthalate	ND		0.40	4.7
Caprolactam	ND	UJ *	2.1	4.7
Carbazole	ND		0.28	4.7
Chrysene	ND		0.31	4.7
Di-n-butyl phthalate	ND		0.29	4.7
Di-n-octyl phthalate	ND		0.45	4.7
Dibenz(a,h)anthracene	ND		0.40	4.7

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **AW-04**

Lab Sample ID: 480-30911-1
Client Matrix: Water

Date Sampled: 12/28/2012 1510
Date Received: 12/28/2012 1625

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-97886	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-97788	Lab File ID:	X3444.D
Dilution:	1.0			Initial Weight/Volume:	1055 mL
Analysis Date:	12/31/2012 2304			Final Weight/Volume:	1 mL
Prep Date:	12/29/2012 0728			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dibenzofuran	ND		0.48	9.5
Diethyl phthalate	ND		0.21	4.7
Dimethyl phthalate	ND		0.34	4.7
Fluoranthene	ND		0.38	4.7
Fluorene	ND		0.34	4.7
Hexachlorobenzene	ND		0.48	4.7
Hexachlorobutadiene	ND		0.64	4.7
Hexachlorocyclopentadiene	ND		0.56	4.7
Hexachloroethane	ND		0.56	4.7
Indeno(1,2,3-cd)pyrene	ND		0.45	4.7
Isophorone	ND		0.41	4.7
N-Nitrosodi-n-propylamine	ND		0.51	4.7
N-Nitrosodiphenylamine	ND		0.48	4.7
Naphthalene	3.6	J	0.72	4.7
Nitrobenzene	ND		0.27	4.7
Pentachlorophenol	ND		2.1	9.5
Phenanthrene	ND		0.42	4.7
Phenol	ND		0.37	4.7
Pyrene	ND		0.32	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	110		52 - 132
2-Fluorobiphenyl	87		48 - 120
2-Fluorophenol	41		20 - 120
Nitrobenzene-d5	93		46 - 120
p-Terphenyl-d14	86		67 - 150
Phenol-d5	29		16 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **AW-03**

Lab Sample ID: 480-30911-2
Client Matrix: Water

Date Sampled: 12/28/2012 1445
Date Received: 12/28/2012 1625

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-98514	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-97788	Lab File ID:	X3481.D
Dilution:	1.0			Initial Weight/Volume:	1010 mL
Analysis Date:	01/07/2013 1235			Final Weight/Volume:	1 mL
Prep Date:	12/29/2012 0728			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Biphenyl	4.5	J	0.65	5.0
bis (2-chloroisopropyl) ether	ND		0.51	5.0
2,4,5-Trichlorophenol	ND		0.48	5.0
2,4,6-Trichlorophenol	ND		0.60	5.0
2,4-Dichlorophenol	ND		0.50	5.0
2,4-Dimethylphenol	ND		0.50	5.0
2,4-Dinitrophenol	ND		2.2	9.9
2,4-Dinitrotoluene	ND		0.44	5.0
2,6-Dinitrotoluene	ND		0.40	5.0
2-Chloronaphthalene	ND		0.46	5.0
2-Chlorophenol	ND		0.52	5.0
2-Methylnaphthalene	39		0.59	5.0
2-Methylphenol	ND		0.40	5.0
2-Nitroaniline	ND		0.42	9.9
2-Nitrophenol	ND		0.48	5.0
3,3'-Dichlorobenzidine	ND		0.40	5.0
3-Nitroaniline	ND		0.48	9.9
4,6-Dinitro-2-methylphenol	ND		2.2	9.9
4-Bromophenyl phenyl ether	ND		0.45	5.0
4-Chloro-3-methylphenol	ND		0.45	5.0
4-Chloroaniline	ND		0.58	5.0
4-Chlorophenyl phenyl ether	ND		0.35	5.0
4-Methylphenol	ND		0.36	9.9
4-Nitroaniline	ND		0.25	9.9
4-Nitrophenol	ND		1.5	9.9
Acenaphthene	81		0.41	5.0
Acenaphthylene	0.78	J	0.38	5.0
Acetophenone	ND		0.53	5.0
Anthracene	7.9		0.28	5.0
Atrazine	ND		0.46	5.0
Benzaldehyde	ND		0.26	5.0
Benzo(a)anthracene	ND		0.36	5.0
Benzo(a)pyrene	ND		0.47	5.0
Benzo(b)fluoranthene	ND		0.34	5.0
Benzo(g,h,i)perylene	ND		0.35	5.0
Benzo(k)fluoranthene	ND		0.72	5.0
Bis(2-chloroethoxy)methane	ND		0.35	5.0
Bis(2-chloroethyl)ether	ND		0.40	5.0
Bis(2-ethylhexyl) phthalate	ND		1.8	5.0
Butyl benzyl phthalate	ND		0.42	5.0
Caprolactam	ND	UJ	2.2	5.0
Carbazole	10		0.30	5.0
Chrysene	ND		0.33	5.0
Di-n-butyl phthalate	ND		0.31	5.0
Di-n-octyl phthalate	ND		0.47	5.0
Dibenz(a,h)anthracene	ND		0.42	5.0

Client: ARCADIS U.S. Inc | Job Number: 480-30911-1

Client Sample ID: **AW-03**

Lab Sample ID: 480-30911-2 | Date Sampled: 12/28/2012 1445
Client Matrix: Water | Date Received: 12/28/2012 1625

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-98514	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-97788	Lab File ID:	X3481.D
Dilution:	1.0			Initial Weight/Volume:	1010 mL
Analysis Date:	01/07/2013 1235			Final Weight/Volume:	1 mL
Prep Date:	12/29/2012 0728			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dibenzofuran	41		0.50	9.9
Diethyl phthalate	ND		0.22	5.0
Dimethyl phthalate	ND		0.36	5.0
Fluoranthene	6.7		0.40	5.0
Fluorene	47		0.36	5.0
Hexachlorobenzene	ND		0.50	5.0
Hexachlorobutadiene	ND		0.67	5.0
Hexachlorocyclopentadiene	ND		0.58	5.0
Hexachloroethane	ND		0.58	5.0
Indeno(1,2,3-cd)pyrene	ND		0.47	5.0
Isophorone	ND		0.43	5.0
N-Nitrosodi-n-propylamine	ND		0.53	5.0
N-Nitrosodiphenylamine	ND		0.50	5.0
Naphthalene	4.9	J	0.75	5.0
Nitrobenzene	ND		0.29	5.0
Pentachlorophenol	ND		2.2	9.9
Phenanthrene	45		0.44	5.0
Phenol	ND		0.39	5.0
Pyrene	3.7	J	0.34	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	109		52 - 132
2-Fluorobiphenyl	92		48 - 120
2-Fluorophenol	42		20 - 120
Nitrobenzene-d5	97		46 - 120
p-Terphenyl-d14	88		67 - 150
Phenol-d5	30		16 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **DUP**

Lab Sample ID: 480-30911-3
Client Matrix: Water

Date Sampled: 12/28/2012 1445
Date Received: 12/28/2012 1625

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-98514	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-97788	Lab File ID:	X3482.D
Dilution:	1.0			Initial Weight/Volume:	1010 mL
Analysis Date:	01/07/2013 1258			Final Weight/Volume:	1 mL
Prep Date:	12/29/2012 0728			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Biphenyl	4.4	J	0.65	5.0
bis (2-chloroisopropyl) ether	ND		0.51	5.0
2,4,5-Trichlorophenol	ND		0.48	5.0
2,4,6-Trichlorophenol	ND		0.60	5.0
2,4-Dichlorophenol	ND		0.50	5.0
2,4-Dimethylphenol	ND		0.50	5.0
2,4-Dinitrophenol	ND		2.2	9.9
2,4-Dinitrotoluene	ND		0.44	5.0
2,6-Dinitrotoluene	ND		0.40	5.0
2-Chloronaphthalene	ND		0.46	5.0
2-Chlorophenol	ND		0.52	5.0
2-Methylnaphthalene	41		0.59	5.0
2-Methylphenol	ND		0.40	5.0
2-Nitroaniline	ND		0.42	9.9
2-Nitrophenol	ND		0.48	5.0
3,3'-Dichlorobenzidine	ND		0.40	5.0
3-Nitroaniline	ND		0.48	9.9
4,6-Dinitro-2-methylphenol	ND		2.2	9.9
4-Bromophenyl phenyl ether	ND		0.45	5.0
4-Chloro-3-methylphenol	ND		0.45	5.0
4-Chloroaniline	ND		0.58	5.0
4-Chlorophenyl phenyl ether	ND		0.35	5.0
4-Methylphenol	ND		0.36	9.9
4-Nitroaniline	ND		0.25	9.9
4-Nitrophenol	ND		1.5	9.9
Acenaphthene	80		0.41	5.0
Acenaphthylene	0.75	J	0.38	5.0
Acetophenone	0.96	J	0.53	5.0
Anthracene	8.3		0.28	5.0
Atrazine	ND		0.46	5.0
Benzaldehyde	ND		0.26	5.0
Benzo(a)anthracene	ND		0.36	5.0
Benzo(a)pyrene	ND		0.47	5.0
Benzo(b)fluoranthene	ND		0.34	5.0
Benzo(g,h,i)perylene	ND		0.35	5.0
Benzo(k)fluoranthene	ND		0.72	5.0
Bis(2-chloroethoxy)methane	ND		0.35	5.0
Bis(2-chloroethyl)ether	ND		0.40	5.0
Bis(2-ethylhexyl) phthalate	ND		1.8	5.0
Butyl benzyl phthalate	ND		0.42	5.0
Caprolactam	ND	UJ	2.2	5.0
Carbazole	11		0.30	5.0
Chrysene	ND		0.33	5.0
Di-n-butyl phthalate	ND		0.31	5.0
Di-n-octyl phthalate	ND		0.47	5.0
Dibenz(a,h)anthracene	ND		0.42	5.0

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **DUP**

Lab Sample ID: 480-30911-3
Client Matrix: Water

Date Sampled: 12/28/2012 1445
Date Received: 12/28/2012 1625

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-98514	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-97788	Lab File ID:	X3482.D
Dilution:	1.0			Initial Weight/Volume:	1010 mL
Analysis Date:	01/07/2013 1258			Final Weight/Volume:	1 mL
Prep Date:	12/29/2012 0728			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dibenzofuran	40		0.50	9.9
Diethyl phthalate	ND		0.22	5.0
Dimethyl phthalate	ND		0.36	5.0
Fluoranthene	6.6		0.40	5.0
Fluorene	45		0.36	5.0
Hexachlorobenzene	ND		0.50	5.0
Hexachlorobutadiene	ND		0.67	5.0
Hexachlorocyclopentadiene	ND		0.58	5.0
Hexachloroethane	ND		0.58	5.0
Indeno(1,2,3-cd)pyrene	ND		0.47	5.0
Isophorone	ND		0.43	5.0
N-Nitrosodi-n-propylamine	ND		0.53	5.0
N-Nitrosodiphenylamine	ND		0.50	5.0
Naphthalene	4.6	J	0.75	5.0
Nitrobenzene	ND		0.29	5.0
Pentachlorophenol	ND		2.2	9.9
Phenanthrene	46		0.44	5.0
Phenol	ND		0.39	5.0
Pyrene	3.6	J	0.34	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	116		52 - 132
2-Fluorobiphenyl	93		48 - 120
2-Fluorophenol	43		20 - 120
Nitrobenzene-d5	101		46 - 120
p-Terphenyl-d14	87		67 - 150
Phenol-d5	30		16 - 120

Client: ARCADIS U.S. Inc | Job Number: 480-30911-1

Client Sample ID: **AW-04**

Lab Sample ID: 480-30911-1 | Date Sampled: 12/28/2012 1510
Client Matrix: Water | Date Received: 12/28/2012 1625

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-98123	Instrument ID:	ICAP1
Prep Method:	3005A	Prep Batch:	480-97911	Lab File ID:	I1010213A-2.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	01/02/2013 1731			Final Weight/Volume:	50 mL
Prep Date:	01/02/2013 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	2.2		0.060	0.20
Antimony	ND		0.0068	0.020
Arsenic	ND		0.0056	0.010
Barium	1.1		0.00070	0.0020
Beryllium	ND		0.00030	0.0020
Cadmium	ND		0.00050	0.0010
Calcium	453		0.10	0.50
Chromium	0.0046		0.0010	0.0040
Cobalt	0.00094	J	0.00063	0.0040
Copper	0.0037	J	0.0016	0.010
Iron	15.9		0.019	0.050
Lead	ND		0.0030	0.0050
Magnesium	83.2		0.043	0.20
Manganese	0.83		0.00040	0.0030
Nickel	0.0026	J	0.0013	0.010
Potassium	49.8		0.10	0.50
Selenium	ND		0.0087	0.015
Silver	ND		0.0017	0.0030
Sodium	649		0.32	1.0
Thallium	ND		0.010	0.020
Vanadium	0.0091		0.0015	0.0050
Zinc	0.011		0.0015	0.010

7470A Mercury (CVAA)

Analysis Method:	7470A	Analysis Batch:	480-98030	Instrument ID:	LEEMAN2
Prep Method:	7470A	Prep Batch:	480-97966	Lab File ID:	H01023W1.PRN
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	01/02/2013 1043			Final Weight/Volume:	50 mL
Prep Date:	01/02/2013 0745				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Mercury	ND		0.00012	0.00020

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **AW-03**

Lab Sample ID: 480-30911-2
Client Matrix: Water

Date Sampled: 12/28/2012 1445
Date Received: 12/28/2012 1625

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-98123	Instrument ID:	ICAP1
Prep Method:	3005A	Prep Batch:	480-97911	Lab File ID:	I1010213A-2.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	01/02/2013 1744			Final Weight/Volume:	50 mL
Prep Date:	01/02/2013 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	ND		0.060	0.20
Antimony	ND		0.0068	0.020
Arsenic	0.0085	J	0.0056	0.010
Barium	0.094		0.00070	0.0020
Beryllium	ND		0.00030	0.0020
Cadmium	ND		0.00050	0.0010
Calcium	373		0.10	0.50
Chromium	0.0025	J	0.0010	0.0040
Cobalt	0.00068	J	0.00063	0.0040
Copper	0.0024	J	0.0016	0.010
Iron	15.5		0.019	0.050
Lead	ND		0.0030	0.0050
Magnesium	23.0		0.043	0.20
Manganese	1.4		0.00040	0.0030
Nickel	ND		0.0013	0.010
Potassium	11.4		0.10	0.50
Selenium	ND		0.0087	0.015
Silver	ND		0.0017	0.0030
Sodium	352		0.32	1.0
Thallium	ND		0.010	0.020
Vanadium	0.0036	J	0.0015	0.0050
Zinc	0.0024	J	0.0015	0.010

7470A Mercury (CVAA)

Analysis Method:	7470A	Analysis Batch:	480-97908	Instrument ID:	LEEMAN2
Prep Method:	7470A	Prep Batch:	480-97853	Lab File ID:	H12312W1.PRN
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	12/31/2012 1144			Final Weight/Volume:	50 mL
Prep Date:	12/31/2012 0815				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Mercury	ND		0.00012	0.00020

Client: ARCADIS U.S. Inc

Job Number: 480-30911-1

Client Sample ID: **DUP**

Lab Sample ID: 480-30911-3
Client Matrix: Water

Date Sampled: 12/28/2012 1445
Date Received: 12/28/2012 1625

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-98123	Instrument ID:	ICAP1
Prep Method:	3005A	Prep Batch:	480-97911	Lab File ID:	I1010213A-2.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	01/02/2013 1751			Final Weight/Volume:	50 mL
Prep Date:	01/02/2013 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	ND		0.060	0.20
Antimony	ND		0.0068	0.020
Arsenic	0.0058	J	0.0056	0.010
Barium	0.094		0.00070	0.0020
Beryllium	ND		0.00030	0.0020
Cadmium	ND		0.00050	0.0010
Calcium	372		0.10	0.50
Chromium	0.0028	J	0.0010	0.0040
Cobalt	ND		0.00063	0.0040
Copper	ND		0.0016	0.010
Iron	15.4		0.019	0.050
Lead	ND		0.0030	0.0050
Magnesium	22.8		0.043	0.20
Manganese	1.4		0.00040	0.0030
Nickel	ND		0.0013	0.010
Potassium	11.2		0.10	0.50
Selenium	ND		0.0087	0.015
Silver	ND		0.0017	0.0030
Sodium	351		0.32	1.0
Thallium	ND		0.010	0.020
Vanadium	0.0037	J	0.0015	0.0050
Zinc	0.0024	J	0.0015	0.010

7470A Mercury (CVAA)

Analysis Method:	7470A	Analysis Batch:	480-97908	Instrument ID:	LEEMAN2
Prep Method:	7470A	Prep Batch:	480-97853	Lab File ID:	H12312W1.PRN
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	12/31/2012 1154			Final Weight/Volume:	50 mL
Prep Date:	12/31/2012 0815				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Mercury	ND		0.00012	0.00020

General Chemistry

Client Sample ID: **AW-04**

Lab Sample ID: 480-30911-1 Date Sampled: 12/28/2012 1510

Client Matrix: Water Date Received: 12/28/2012 1625

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	0.011	J	mg/L	0.0050	0.020	1.0	9012A
Analysis Batch: 480-98115	Analysis Date: 01/03/2013 0042						
Prep Batch: 480-98009	Prep Date: 01/02/2013 0945						
Cyanide, Free	ND		ug/L	0.54	5.0	1.0	9016
Analysis Batch: 460-141611	Analysis Date: 12/31/2012 1300						
Prep Batch: 460-141569	Prep Date: 12/31/2012 0700						

General Chemistry

Client Sample ID: **AW-03**

Lab Sample ID: 480-30911-2 Date Sampled: 12/28/2012 1445
Client Matrix: Water Date Received: 12/28/2012 1625

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	0.11		mg/L	0.0050	0.020	1.0	9012A
Analysis Batch: 480-98115	Analysis Date: 01/03/2013 0045						
Prep Batch: 480-98009	Prep Date: 01/02/2013 0945						
Cyanide, Free	ND		ug/L	0.54	5.0	1.0	9016
Analysis Batch: 460-141611	Analysis Date: 12/31/2012 1300						
Prep Batch: 460-141569	Prep Date: 12/31/2012 0700						

General Chemistry

Client Sample ID: **DUP**

Lab Sample ID: 480-30911-3 Date Sampled: 12/28/2012 1445

Client Matrix: Water Date Received: 12/28/2012 1625

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	0.093	J	mg/L	0.0050	0.020	1.0	9012A
Analysis Batch: 480-98115	Analysis Date: 01/03/2013 0046						
Prep Batch: 480-98009	Prep Date: 01/02/2013 0945						
Cyanide, Free	1.6	J	ug/L	0.54	5.0	1.0	9016
Analysis Batch: 460-141611	Analysis Date: 12/31/2012 1300						
Prep Batch: 460-141569	Prep Date: 12/31/2012 0700						

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National Fuel

Data Usability Summary Report (DUSR)

BUFFALO, NEW YORK

Volatile, Semivolatile, Metals, and Miscellaneous Analyses

SDG #480-28494

Analyses Performed By:
TestAmerica Laboratories
Buffalo, New York

Report #18090R
Review Level: Tier III
Project: B0023310.0000.00001

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #480-28494 for samples collected in association with the National Fuel Wilkenson Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
AW-03 (4-8 COMPOSITE)	284941	soil	11/11/2012		X	X		X	X
AW-03 (18-20)	284942	soil	11/11/2012		X	X		X	X
AW-03 (20-22)	284943	soil	11/11/2012		X	X		X	X
AW-04 (4-8 COMPOSITE)	284944	soil	11/12/2012		X	X		X	X
AW-04 (22-22.5)	284945	soil	11/12/2012		X	X		X	X
FD01111212	284946	soil	11/12/2012	AW-04 (4-8 COMPOSITE)	X	X		X	X
RB111212	284947	water	11/12/2012		X	X		X	X
TB111412	284948	water	11/14/2012		X				

Note:

1. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location FD01111212 for volatile and semi-volatile analyses.
2. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample locations FD01111212 and AW-04 (4-8 COMPOSITE) for metal analyses.
3. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample locations FD01111212 and RB111212 for cyanide analyses.
4. Miscellaneous parameters include total and free cyanide.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 8260B and 8270C as referenced in NYSDEC-ASP. Data were reviewed in accordance with USEPA Region II SOP HW-24 - Validating Volatile Organic Compounds by SW-846 Method 8260B of October 2006 and New York State ASP 2005.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260B	Water	14 days from collection to analysis (7 days if unpreserved)	Cool to 4°C±2°C; preserved to a pH of less than 2 s.u.
	Soil	14 days from collection to analysis	Cool to 4°C±2°C.

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
AW-03 (4-8 COMPOSITE) AW-03 (18-20) AW-03 (20-22) AW-04 (4-8 COMPOSITE) AW-04 (22-22.5) FD01111212	CCV %D	Bromomethane	21.2%
		1,2-Dichloroethane	24.2%
		Methylcyclohexane	-21.5%
RB111212 TB111412	CCV %D	Chloromethane	-20.7%
		Carbon tetrachloride	30.2%
		1,2,4-Trichlorobenzene	-20.8%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 15% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD >90%	Non-detect	R
		Detect	J
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
FD01111212	1,1-Dichloroethene	<LL but >10%	<LL but >10%
	1,2-Dichlorobenzene	<LL but >10%	<LL but >10%
	Benzene	<LL but >10%	<LL but >10%
	Chlorobenzene	<LL but >10%	<LL but >10%
	cis-1,2-Dichloroethene	<LL but >10%	<LL but >10%
	Ethylbenzene	<LL but >10%	<LL but >10%
	Tetrachloroethene	<LL but >10%	<LL but >10%
	Toluene	<LL but >10%	<LL but >10%
	trans-1,2-Dichloroethene	<LL but >10%	<LL but >10%
	Trichloroethene	<LL but >10%	<LL but >10%

LL Lower Limit

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery
AW-03 (4-8 COMPOSITE) AW-03 (18-20) AW-03 (20-22) AW-04 (4-8 COMPOSITE) AW-04 (22-22.5) FD01111212	1,2-Dichloroethane	> UL

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the

RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-04 (4-8 COMPOSITE)/ FD01111212	Benzene	6.9	5.5 U	AC
	Ethylbenzene	29	2 J	NC
	Isopropylbenzene	1.3 J	5.5 U	AC
	Methylene Chloride	6.2 U	3.7 J	AC
	Toluene	4.9 J	5.5 U	AC
	Xylenes, Total	1.1 J	11 U	AC

AC Acceptable
NC Not compliant

The compound ethylbenzene associated with sample locations AW-04 (4-8 COMPOSITE) and FD01111212 exhibited a field duplicate RPD greater than the control limit. The associated sample results from sample locations for the listed analyte were qualified as estimated.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X	X		
Laboratory Control Sample Duplicate(LCSD)					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS)		X	X		
Matrix Spike Duplicate(MSD)		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X	X		
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present				X	

VOCs: SW-846 8260B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
E. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270C	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cooled @ 4°C ± 2°C
	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cooled @ 4°C ± 2°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. No qualifications of the sample results were required.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/ Continuing	Compound	Criteria
FD01111212	CCV %D	2,4-Dinitrophenol	-22.5%
AW-03 (4-8 COMPOSITE) AW-03 (18-20) AW-04 (4-8 COMPOSITE) AW-04 (22-22.5)	CCV %D	Benzo(g,h,i)perylene	26.7%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 15% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD >90%	Non-detect	R
		Detect	J
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
FD01111212	Bis(2-ethylhexyl) phthalate	AC	>UL
	Pyrene	<10%	<LL but >10%

AC Acceptable
UL Upper Limit
LL Lower Limit

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ

Control Limit	Sample Result	Qualification
	Detect	J
< 10%	Non-detect	R
	Detect	J
Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action

Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample Locations	Compound
FD01111212	Fluorene

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

8. Laboratory Control Sample (LCS/) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-04 (4-8 COMPOSITE)/ FD01111212	2-Methylnaphthalene	66 J	280 J	AC
	Acenaphthene	180 J	970	AC
	Acenaphthylene	160 J	200 J	AC
	Anthracene	690 J	2000	AC

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
	Benzo(a)anthracene	1400	3700	AC
	Benzo(a)pyrene	1600	3700	AC
	Benzo(b)fluoranthene	1900	4500	AC
	Benzo(g,h,i)perylene	340 J	1300	AC
	Benzo(k)fluoranthene	1100	2300	AC
	Biphenyl	1000 U	77 J	AC
	Carbazole	110 J	620 J	AC
	Chrysene	1400	3300	AC
	Dibenz(a,h)anthracene	800 J	940 J	AC
	Dibenzofuran	130 J	650 J	AC
	Fluoranthene	2600	8100	NC
	Fluorene	270 J	1100	AC
	Indeno(1,2,3-cd)pyrene	890 J	1600	AC
	Naphthalene	160 J	360 J	AC
	Phenanthrene	1600	6800	NC
	Pyrene	1900	7100	NC

AC Acceptable
NC Not compliant

The compounds fluoranthene, phenanthrene and pyrene associated with sample locations AW-04 (4-8 COMPOSITE) and FD01111212 exhibited a field duplicate RPD greater than the control limit. The associated sample results from sample locations for the listed analyte were qualified as estimated.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
D. Method blanks		X		X	
E. Equipment blanks		X	X		
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate(MSD) %R		X	X		
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X	X		
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
F. Reconstructed ion chromatograms		X		X	
G. Quantitation Reports		X		X	
H. RT of sample compounds within the established RT windows		X		X	
I. Transcription/calculation errors present				X	
J. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6000/7000 and 9012A/9016. Data were reviewed in accordance with USEPA National Functional Guidelines of July 2002.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010B	Water	180 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to 4°C±2°C.
SW-846 7470	Water	28 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool to 4°C±2°C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. Therefore, sample results greater than the BAL resulted in the removal of the laboratory qualifier (B). No other qualification of the sample results was required.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All analytes associated with CRDL standard recoveries were within control limits with the exception of the analytes presented in the following table.

Sample Locations	Analytes	CRDL Recovery
RB111212	Arsenic	137%
	Silver	137%

The criteria applied to evaluate the CRDL Standard criteria are presented below. In the case of a calibration deviation, the sample results are qualified.

CRDL Standard Recovery Criteria			
Analytes	**Control Limit**	**Sample Result**	**Qualification**
All analytes, with the exception of Al, Ba, Ca, Fe, Mg, Na, and K	CRDL %R <50% (<30% for Sb, Pb, Tl)	Sample results ≥ MDL but <2x CRDL	R
		Non-detect sample results	R
		Detected sample results ≥ 2x CRDL	J
	CRDL %R 50-69% (30-49% for Sb, Pb, Tl)	Sample results ≥ MDL but <2x CRDL	J
		Non-detect sample results	UJ
		Detected sample results ≥ 2x CRDL	No Action
	%R >130% but <180% (>150% but <200% for Sb, Pb, Tl)	Sample results ≥ MDL but <2x CRDL	J
		Non-detect sample results	No Action
		Detected sample results ≥ 2x CRDL	No Action
	CRI %R >180% (>200% for Sb, Pb, Tl)	Sample results ≥ MDL	R

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analyte present in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
AW-03 (4-8 COMPOSITE) AW-03 (18-20) AW-03 (20-22) AW-04 (4-8 COMPOSITE) AW-04 (22-22.5) FD01111212	Antimony	70%	74%
	Barium	0%	39%
	Potassium	AC	126%
	Zinc	153%	135%
	Mercury	51%	AC

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
	Detect	J
MS/MSD percent recovery <30%	Non-detect	R
	Detect	J
MS/MSD percent recovery >125%	Non-detect	No Action
	Detect	J

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

The MS/MSD was performed in replace of the laboratory duplicate analysis. Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample Locations	Analyte
AW-03 (4-8 COMPOSITE) AW-03 (18-20) AW-03 (20-22) AW-04 (4-8 COMPOSITE) AW-04 (22-22.5) FD01111212	Barium
	Mercury

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-04 (4-8 COMPOSITE)/ FD01111212	Aluminum	6000	10500	54.5%
	Arsenic	6.2	5.4	AC
	Barium	55.8	143	87.7%
	Beryllium	0.47	1.9	AC
	Cadmium	0.38	0.4	AC
	Calcium	103000	90500	12.9%
	Chromium	8.8	7.9	10.8%
	Cobalt	4.9	4.9	0.0%
	Copper	17.8	19.6	9.6%
	Iron	12000	12600	4.9%
	Lead	45.5	47.1	3.5%
	Magnesium	38600	17900	73.3%
	Manganese	525	950	57.6%
	Nickel	13.4	14.9	AC

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
	Potassium	1060	1110	4.6%
	Selenium	4.6 U	1.1 J	AC
	Sodium	252	423	AC
	Vanadium	12	11.1	7.8%
	Zinc	70.7	74.7	5.5%
	Mercury	0.035	0.062	AC

AC - Acceptable

The compounds aluminum, barium, magnesium and manganese associated with sample locations AW-04 (4-8 COMPOSITE) and FD01111212 exhibited a field duplicate RPD greater than the control limit. The associated sample results from sample locations for the listed analyte were qualified as estimated.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

All serial dilutions were within control limits, with the exception of the analytes presented in the following table. The sample locations associated with the deviant %D are also presented in the following table.

Sample Locations	Analytes	Serial Dilution (%D)
FD01111212	Calcium	15%
	Iron	11%
	Manganese	13%
	Zinc	17%

The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6000/7000	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP) Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X	X		
B. Method Blanks		X	X		
C. Equipment/Field Blanks		X	X		
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X	X		
ICP Serial Dilution		X	X		
Reporting Limit Verification		X		X	
Raw Data		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard		X		X	
ICP Interference Check		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%R Percent recovery
RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Total/Free Cyanide by SW-846 9012A/9016	Water	14 days from collection to analysis	Cooled @ 4°C ± 2; preserved to a pH of greater than 12.
	Soil		Cooled @ 4°C ± 2.

The analyses that exceeded the holding time are presented in the following table.

Sample Locations	Preservation/ Holding Time	Criteria
RB111212	pH=7 and analyzed in 14 days	preserved to a pH of greater than 12

Sample results associated with sample locations analyzed by analytical method SW-846 9016 were qualified, as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Unpreserved	J	UJ

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. No other qualification of the sample results was required.

3. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all initial calibration verification standard recoveries were within control limits.

All analytes associated with calibration standard recoveries were within control limits, with the exception of the analytes presented in the following table.

Sample Locations	Initial/Continuing	Analytes	Standard Recovery
RB111212	CCV	Cyanide	199%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Analytes	Control Limit	Sample Result	Qualification
Cyanide	75% to 89%	Non-detect	UJ
		Detect	J
	111% to 125%	Non-detect	No Action
		Detect	J
	<75%	Non-detect	R
		Detect	J
	>125%	Non-detect	No Action
		Detect	J

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD analysis performed on sample locations FD01111212 and RB111212 exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-04 (4-8 COMPOSITE)/ FD01111212	Cyanide	3.8	2.4	AC
	Cyanide, Free	0.13 J	0.18 J	AC

AC - Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All LCS recoveries were within control limits, with the exception of the analytes associated with sample locations, as presented in the following table.

Sample Location	Analytes	LCS Recovery
RB111212	Cyanide, Total	65%

The criteria used to evaluate LCS recoveries are presented in the following table. In the case of an LCS deviation, the sample results are qualified.

Control limit	Sample Result	Qualification
LCS (water) percent recovery 50% to 79%	Non-detect	UJ
	Detect	J
LCS (water) percent recovery <50%	Non-detect	R
	Detect	J
LCS (water) percent recovery >120%	Non-detect	No Action
	Detect	J
LCS (soil) percent recovery < lower limit	Non-detect	UJ
	Detect	J
LCS (soil) percent recovery > upper limit	Non-detect	No Action
	Detect	J

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SW-846 9012A and 9016	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X	X		
Laboratory Control Sample (LCS) %R		X	X		
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X	X		
Raw Data		X		X	
Transcription/calculation errors present				X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference

SAMPLE COMPLIANCE REPORT

Sample Delivery Group (SDG)	Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
					VOC	SVOC	PCB	MET	MISC	
480-28494	11/11/2012	SW846	AW-03 (4-8 COMPOSITE)	solid	no	no	--	no	yes	VOC-continuing calibration %D, LCS %Recovery SVOC-continuing calibration %D METALS-MS/MSD, MS/MSD RPD
	11/11/2012	SW846	AW-03 (18-20)	solid	no	no	--	no	yes	VOC- continuing calibration %D, LCS %Recovery SVOC-continuing calibration %D METALS-MS/MSD, MS/MSD RPD
	11/11/2012	SW846	AW-03 (20-22)	solid	no	no	--	no	yes	VOC- continuing calibration %D, LCS %Recovery METALS-MS/MSD, MS/MSD RPD
	11/12/2012	SW846	AW-04 (4-8 COMPOSITE)	solid	no	no	--	no	yes	VOC- continuing calibration %D, LCS %Recovery, field duplicate RPD SVOC-continuing calibration %D, field duplicate RPD METALS-MS/MSD, MS/MSD RPD, field duplicate RPD
	11/12/2012	SW846	AW-04 (22-22.5)	solid	no	no	--	no	yes	VOC- continuing calibration %D, LCS %Recovery SVOC-continuing calibration %D METALS-MS/MSD, MS/MSD RPD
	11/12/2012	SW846	FD01111212	solid	no	no	--	no	yes	VOC- continuing calibration %D, LCS %Recovery, MS/MSD %Recovery, field duplicate RPD SVOC-MS/MSD %Recovery, MS/MSD RPD, continuing calibration %D, field duplicate RPD METALS-MS/MSD, MS/MSD RPD, serial dilution %D, field duplicate RPD
	11/12/2012	SW846	RB111212	solid	no	yes	--	no	no	VOC- continuing calibration %D, LCS %Recovery METAL-CRDL CYANIDE-continuing calibration %D,

Sample Delivery Group (SDG)	Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
					VOC	SVOC	PCB	MET	MISC	
										laboratory control sample %R, holding time
	11/14/2012	SW846	TB111412	water	no	--	--	--	--	VOC- continuing calibration %D, LCS %Recovery

1 Samples which are compliant with no added validation qualifiers are listed as "yes". Samples which are non-compliant or which have added qualifiers are listed as "no". A "no" designation does not necessarily indicate that the data have been rejected or are otherwise unusable.

VALIDATION PERFORMED BY: Julie R Tantalo

SIGNATURE: Julie R Tantalo

DATE: January 16, 2013

PEER REVIEW: Dennis Capria

DATE: January 16, 2013

CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☒

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client	Project Manager	Date	Chain of Custody Number
ARCADIS	Scott Powlin	11/14/12	241276
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
50 Fountain Plaza	315-671-9456		
City Buffalo	**State** NY **Zip Code** 14202	**Site Contact** J. Baxter	**Lab Contact**
Project Name and Location (State) Wilkeson Slip 4th Street Buffalo, NY	**Carrier/Waybill Number** Delivery		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Analysis: 8260B	8270C	6010B/7471A	9016	8012A	Special Instructions/ Conditions of Receipt
AW-03 (4-8 Composite)	11/11/12	12:25				X	6						X	X	X	X	X	
AW-03 (18-20)	11/11/12	15:40				X	6						X	X	X	X	X	
AW-03 (20-22)	11/11/12	15:55				X	6						X	X	X	X	X	
AW-04 (4-8 Composite)	11/12/12	7:38				X	6						X	X	X	X	X	
AW-04 (22-22.5)	11/12/12	9:15				X	6						X	X	X	X	X	
FD01111212	11/12/12	—				X	7B						X	X	X	X	X	MS/MSD if Sufficient Volume.
RB111212	11/12/12	7:45		X			2		1	1	3		X	X	X	X	X	
TB111412	11/14/12			X						1			X	X	X	X	X	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other 5D

QC Requirements (Specify)

	Relinquished By	Date	Time	Received By	Date	Time
1.	[signature]	11/14/12	1200	[signature]	11/14/12	1200
2.						
3.						

Comments

4.0°C

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-03 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-1 | Date Sampled: 11/11/2012 1225
Client Matrix: Solid | % Moisture: 18.0 | Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3649.D
Dilution:	1.0			Initial Weight/Volume:	5.19 g
Analysis Date:	11/16/2012 1809			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.43	5.9
1,1,2,2-Tetrachloroethane		ND		0.95	5.9
1,1,2-Trichloroethane		ND		0.76	5.9
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.3	5.9
1,1-Dichloroethane		ND		0.72	5.9
1,1-Dichloroethene		ND		0.72	5.9
1,2,4-Trichlorobenzene		ND		0.36	5.9
1,2-Dibromo-3-Chloropropane		ND		2.9	5.9
1,2-Dibromoethane		ND		0.75	5.9
1,2-Dichlorobenzene		ND		0.46	5.9
1,2-Dichloroethane		ND		0.29	5.9
1,2-Dichloropropane		ND		2.9	5.9
1,3-Dichlorobenzene		ND		0.30	5.9
1,4-Dichlorobenzene		ND		0.82	5.9
2-Hexanone		ND		2.9	29
2-Butanone (MEK)		ND		2.1	29
4-Methyl-2-pentanone (MIBK)		ND		1.9	29
Acetone		30		4.9	29
Benzene		ND		0.29	5.9
Bromodichloromethane		ND		0.79	5.9
Bromoform		ND		2.9	5.9
Bromomethane		ND		0.53	5.9
Carbon disulfide		ND		2.9	5.9
Carbon tetrachloride		ND		0.57	5.9
Chlorobenzene		ND		0.77	5.9
Dibromochloromethane		ND		0.75	5.9
Chloroethane		ND		1.3	5.9
Chloroform		ND		0.36	5.9
Chloromethane		ND		0.35	5.9
cis-1,2-Dichloroethene		ND		0.75	5.9
cis-1,3-Dichloropropene		ND		0.85	5.9
Cyclohexane		ND		0.82	5.9
Dichlorodifluoromethane		ND		0.48	5.9
Ethylbenzene		ND		0.41	5.9
Isopropylbenzene		ND		0.89	5.9
Methyl acetate		ND		1.1	5.9
Methyl tert-butyl ether		ND		0.58	5.9
Methylcyclohexane		ND J		0.89	5.9
Methylene Chloride		3.1	J	2.7	5.9
Styrene		ND		0.29	5.9
Tetrachloroethene		ND		0.79	5.9
Toluene		1.1	J	0.44	5.9
trans-1,2-Dichloroethene		ND		0.61	5.9
trans-1,3-Dichloropropene		ND		2.6	5.9
Trichloroethene		ND		1.3	5.9
Trichlorofluoromethane		ND		0.56	5.9

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-03 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-1 | Date Sampled: 11/11/2012 1225
Client Matrix: Solid | % Moisture: 18.0 | Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3649.D
Dilution:	1.0			Initial Weight/Volume:	5.19 g
Analysis Date:	11/16/2012 1809			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.72	5.9
Xylenes, Total		ND		0.99	12

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	97		64 - 126
Toluene-d8 (Surr)	85		71 - 125
4-Bromofluorobenzene (Surr)	85		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **AW-03 (18-20)**

Lab Sample ID: 480-28494-2
Client Matrix: Solid
% Moisture: 15.3
Date Sampled: 11/11/2012 1540
Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3650.D
Dilution:	1.0			Initial Weight/Volume:	5.53 g
Analysis Date:	11/16/2012 1834			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.39	5.3
1,1,2,2-Tetrachloroethane		ND		0.87	5.3
1,1,2-Trichloroethane		ND		0.69	5.3
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.2	5.3
1,1-Dichloroethane		ND		0.65	5.3
1,1-Dichloroethene		ND		0.65	5.3
1,2,4-Trichlorobenzene		ND		0.32	5.3
1,2-Dibromo-3-Chloropropane		ND		2.7	5.3
1,2-Dibromoethane		ND		0.68	5.3
1,2-Dichlorobenzene		ND		0.42	5.3
1,2-Dichloroethane		ND		0.27	5.3
1,2-Dichloropropane		ND		2.7	5.3
1,3-Dichlorobenzene		ND		0.27	5.3
1,4-Dichlorobenzene		ND		0.75	5.3
2-Hexanone		ND		2.7	27
2-Butanone (MEK)		ND		2.0	27
4-Methyl-2-pentanone (MIBK)		ND		1.7	27
Acetone		ND		4.5	27
Benzene		ND		0.26	5.3
Bromodichloromethane		ND		0.71	5.3
Bromoform		ND		2.7	5.3
Bromomethane		ND		0.48	5.3
Carbon disulfide		ND		2.7	5.3
Carbon tetrachloride		ND		0.52	5.3
Chlorobenzene		ND		0.70	5.3
Dibromochloromethane		ND		0.68	5.3
Chloroethane		ND		1.2	5.3
Chloroform		ND		0.33	5.3
Chloromethane		ND		0.32	5.3
cis-1,2-Dichloroethene		ND		0.68	5.3
cis-1,3-Dichloropropene		ND		0.77	5.3
Cyclohexane		ND		0.75	5.3
Dichlorodifluoromethane		ND		0.44	5.3
Ethylbenzene		27		0.37	5.3
Isopropylbenzene		9.9		0.80	5.3
Methyl acetate		ND		0.99	5.3
Methyl tert-butyl ether		ND		0.52	5.3
Methylcyclohexane		ND J		0.81	5.3
Methylene Chloride		2.7	J	2.5	5.3
Styrene		ND		0.27	5.3
Tetrachloroethene		ND		0.72	5.3
Toluene		3.6	J	0.40	5.3
trans-1,2-Dichloroethene		ND		0.55	5.3
trans-1,3-Dichloropropene		ND		2.3	5.3
Trichloroethene		ND		1.2	5.3
Trichlorofluoromethane		ND		0.50	5.3

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-03 (18-20)**

Lab Sample ID: 480-28494-2 | Date Sampled: 11/11/2012 1540
Client Matrix: Solid | % Moisture: 15.3 | Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3650.D
Dilution:	1.0			Initial Weight/Volume:	5.53 g
Analysis Date:	11/16/2012 1834			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.65	5.3
Xylenes, Total		ND		0.90	11

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	101		64 - 126
Toluene-d8 (Surr)	86		71 - 125
4-Bromofluorobenzene (Surr)	89		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **AW-03 (20-22)**

Lab Sample ID: 480-28494-3
Client Matrix: Solid
% Moisture: 16.5
Date Sampled: 11/11/2012 1555
Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3651.D
Dilution:	1.0			Initial Weight/Volume:	5.26 g
Analysis Date:	11/16/2012 1859			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.41	5.7
1,1,2,2-Tetrachloroethane		ND		0.92	5.7
1,1,2-Trichloroethane		ND		0.74	5.7
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.3	5.7
1,1-Dichloroethane		ND		0.69	5.7
1,1-Dichloroethene		ND		0.70	5.7
1,2,4-Trichlorobenzene		ND		0.35	5.7
1,2-Dibromo-3-Chloropropane		ND		2.8	5.7
1,2-Dibromoethane		ND		0.73	5.7
1,2-Dichlorobenzene		ND		0.45	5.7
1,2-Dichloroethane		ND		0.29	5.7
1,2-Dichloropropane		ND		2.8	5.7
1,3-Dichlorobenzene		ND		0.29	5.7
1,4-Dichlorobenzene		ND		0.80	5.7
2-Hexanone		ND		2.8	28
2-Butanone (MEK)		ND		2.1	28
4-Methyl-2-pentanone (MIBK)		ND		1.9	28
Acetone		6.6	J	4.8	28
Benzene		2.9	J	0.28	5.7
Bromodichloromethane		ND		0.76	5.7
Bromoform		ND		2.8	5.7
Bromomethane		ND		0.51	5.7
Carbon disulfide		ND		2.8	5.7
Carbon tetrachloride		ND		0.55	5.7
Chlorobenzene		ND		0.75	5.7
Dibromochloromethane		ND		0.73	5.7
Chloroethane		ND		1.3	5.7
Chloroform		ND		0.35	5.7
Chloromethane		ND		0.34	5.7
cis-1,2-Dichloroethene		ND		0.73	5.7
cis-1,3-Dichloropropene		ND		0.82	5.7
Cyclohexane		ND		0.80	5.7
Dichlorodifluoromethane		ND		0.47	5.7
Ethylbenzene		34		0.39	5.7
Isopropylbenzene		17		0.86	5.7
Methyl acetate		ND		1.1	5.7
Methyl tert-butyl ether		ND		0.56	5.7
Methylcyclohexane		ND	J	0.87	5.7
Methylene Chloride		ND		2.6	5.7
Styrene		ND		0.28	5.7
Tetrachloroethene		ND		0.76	5.7
Toluene		6.5		0.43	5.7
trans-1,2-Dichloroethene		ND		0.59	5.7
trans-1,3-Dichloropropene		ND		2.5	5.7
Trichloroethene		ND		1.3	5.7
Trichlorofluoromethane		ND		0.54	5.7

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-03 (20-22)**

Lab Sample ID: 480-28494-3 | Date Sampled: 11/11/2012 1555
Client Matrix: Solid | % Moisture: 16.5 | Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3651.D
Dilution:	1.0			Initial Weight/Volume:	5.26 g
Analysis Date:	11/16/2012 1859			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.69	5.7
Xylenes, Total		ND		0.96	11

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	95		64 - 126
Toluene-d8 (Surr)	84		71 - 125
4-Bromofluorobenzene (Surr)	88		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **AW-04 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-4
Client Matrix: Solid
% Moisture: 17.8
Date Sampled: 11/12/2012 0738
Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3652.D
Dilution:	1.0			Initial Weight/Volume:	4.89 g
Analysis Date:	11/16/2012 1925			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.45	6.2
1,1,2,2-Tetrachloroethane		ND		1.0	6.2
1,1,2-Trichloroethane		ND		0.81	6.2
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.4	6.2
1,1-Dichloroethane		ND		0.76	6.2
1,1-Dichloroethene		ND		0.76	6.2
1,2,4-Trichlorobenzene		ND		0.38	6.2
1,2-Dibromo-3-Chloropropane		ND		3.1	6.2
1,2-Dibromoethane		ND		0.80	6.2
1,2-Dichlorobenzene		ND		0.49	6.2
1,2-Dichloroethane		ND		0.31	6.2
1,2-Dichloropropane		ND		3.1	6.2
1,3-Dichlorobenzene		ND		0.32	6.2
1,4-Dichlorobenzene		ND		0.87	6.2
2-Hexanone		ND		3.1	31
2-Butanone (MEK)		ND		2.3	31
4-Methyl-2-pentanone (MIBK)		ND		2.0	31
Acetone		ND		5.2	31
Benzene		6.9		0.30	6.2
Bromodichloromethane		ND		0.83	6.2
Bromoform		ND		3.1	6.2
Bromomethane		ND		0.56	6.2
Carbon disulfide		ND		3.1	6.2
Carbon tetrachloride		ND		0.60	6.2
Chlorobenzene		ND		0.82	6.2
Dibromochloromethane		ND		0.80	6.2
Chloroethane		ND		1.4	6.2
Chloroform		ND		0.38	6.2
Chloromethane		ND		0.38	6.2
cis-1,2-Dichloroethene		ND		0.80	6.2
cis-1,3-Dichloropropene		ND		0.90	6.2
Cyclohexane		ND		0.87	6.2
Dichlorodifluoromethane		ND		0.51	6.2
Ethylbenzene		29 J		0.43	6.2
Isopropylbenzene		1.3	J	0.94	6.2
Methyl acetate		ND		1.2	6.2
Methyl tert-butyl ether		ND		0.61	6.2
Methylcyclohexane		ND J		0.95	6.2
Methylene Chloride		ND		2.9	6.2
Styrene		ND		0.31	6.2
Tetrachloroethene		ND		0.83	6.2
Toluene		4.9	J	0.47	6.2
trans-1,2-Dichloroethene		ND		0.64	6.2
trans-1,3-Dichloropropene		ND		2.7	6.2
Trichloroethene		ND		1.4	6.2
Trichlorofluoromethane		ND		0.59	6.2

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-04 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-4 | Date Sampled: 11/12/2012 0738
Client Matrix: Solid | % Moisture: 17.8 | Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3652.D
Dilution:	1.0			Initial Weight/Volume:	4.89 g
Analysis Date:	11/16/2012 1925			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.76	6.2
Xylenes, Total		1.1	J	1.0	12

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	97		64 - 126
Toluene-d8 (Surr)	83		71 - 125
4-Bromofluorobenzene (Surr)	86		72 - 126

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-04 (22-22.5)**

Lab Sample ID: 480-28494-5 | Date Sampled: 11/12/2012 0915
Client Matrix: Solid | % Moisture: 16.0 | Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3653.D
Dilution:	1.0			Initial Weight/Volume:	5.23 g
Analysis Date:	11/16/2012 1951			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.41	5.7
1,1,2,2-Tetrachloroethane		ND		0.92	5.7
1,1,2-Trichloroethane		ND		0.74	5.7
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.3	5.7
1,1-Dichloroethane		ND		0.69	5.7
1,1-Dichloroethene		ND		0.70	5.7
1,2,4-Trichlorobenzene		ND		0.35	5.7
1,2-Dibromo-3-Chloropropane		ND		2.8	5.7
1,2-Dibromoethane		ND		0.73	5.7
1,2-Dichlorobenzene		ND		0.45	5.7
1,2-Dichloroethane		ND		0.29	5.7
1,2-Dichloropropane		ND		2.8	5.7
1,3-Dichlorobenzene		ND		0.29	5.7
1,4-Dichlorobenzene		ND		0.80	5.7
2-Hexanone		ND		2.8	28
2-Butanone (MEK)		ND		2.1	28
4-Methyl-2-pentanone (MIBK)		ND		1.9	28
Acetone		ND		4.8	28
Benzene		7.3		0.28	5.7
Bromodichloromethane		ND		0.76	5.7
Bromoform		ND		2.8	5.7
Bromomethane		ND		0.51	5.7
Carbon disulfide		ND		2.8	5.7
Carbon tetrachloride		ND		0.55	5.7
Chlorobenzene		ND		0.75	5.7
Dibromochloromethane		ND		0.73	5.7
Chloroethane		ND		1.3	5.7
Chloroform		ND		0.35	5.7
Chloromethane		ND		0.34	5.7
cis-1,2-Dichloroethene		ND		0.73	5.7
cis-1,3-Dichloropropene		ND		0.82	5.7
Cyclohexane		ND		0.80	5.7
Dichlorodifluoromethane		ND		0.47	5.7
Ethylbenzene		5.9		0.39	5.7
Isopropylbenzene		1.6	J	0.86	5.7
Methyl acetate		ND		1.1	5.7
Methyl tert-butyl ether		ND		0.56	5.7
Methylcyclohexane		ND J		0.87	5.7
Methylene Chloride		ND		2.6	5.7
Styrene		ND		0.28	5.7
Tetrachloroethene		ND		0.76	5.7
Toluene		ND		0.43	5.7
trans-1,2-Dichloroethene		ND		0.59	5.7
trans-1,3-Dichloropropene		ND		2.5	5.7
Trichloroethene		ND		1.3	5.7
Trichlorofluoromethane		ND		0.54	5.7

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-04 (22-22.5)**

Lab Sample ID: 480-28494-5 | Date Sampled: 11/12/2012 0915
Client Matrix: Solid | % Moisture: 16.0 | Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3653.D
Dilution:	1.0			Initial Weight/Volume:	5.23 g
Analysis Date:	11/16/2012 1951			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.69	5.7
Xylenes, Total		5.4	J	0.96	11

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	100		64 - 126
Toluene-d8 (Surr)	86		71 - 125
4-Bromofluorobenzene (Surr)	89		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **FD01111212**

Lab Sample ID: 480-28494-6
Client Matrix: Solid
% Moisture: 11.4
Date Sampled: 11/12/2012 0000
Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3654.D
Dilution:	1.0			Initial Weight/Volume:	5.14 g
Analysis Date:	11/16/2012 2017			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1-Trichloroethane		ND		0.40	5.5
1,1,2,2-Tetrachloroethane		ND		0.89	5.5
1,1,2-Trichloroethane		ND		0.71	5.5
1,1,2-Trichloro-1,2,2-trifluoroethane		ND		1.3	5.5
1,1-Dichloroethane		ND		0.67	5.5
1,1-Dichloroethene		ND J		0.67	5.5
1,2,4-Trichlorobenzene		ND		0.33	5.5
1,2-Dibromo-3-Chloropropane		ND		2.7	5.5
1,2-Dibromoethane		ND		0.71	5.5
1,2-Dichlorobenzene		ND J		0.43	5.5
1,2-Dichloroethane		ND		0.28	5.5
1,2-Dichloropropane		ND		2.7	5.5
1,3-Dichlorobenzene		ND		0.28	5.5
1,4-Dichlorobenzene		ND		0.77	5.5
2-Hexanone		ND		2.7	27
2-Butanone (MEK)		ND		2.0	27
4-Methyl-2-pentanone (MIBK)		ND		1.8	27
Acetone		ND		4.6	27
Benzene		ND J		0.27	5.5
Bromodichloromethane		ND		0.74	5.5
Bromoform		ND		2.7	5.5
Bromomethane		ND		0.49	5.5
Carbon disulfide		ND		2.7	5.5
Carbon tetrachloride		ND		0.53	5.5
Chlorobenzene		ND J		0.72	5.5
Dibromochloromethane		ND		0.70	5.5
Chloroethane		ND		1.2	5.5
Chloroform		ND		0.34	5.5
Chloromethane		ND		0.33	5.5
cis-1,2-Dichloroethene		ND J		0.70	5.5
cis-1,3-Dichloropropene		ND		0.79	5.5
Cyclohexane		ND		0.77	5.5
Dichlorodifluoromethane		ND		0.45	5.5
Ethylbenzene		2.0	J	0.38	5.5
Isopropylbenzene		ND		0.83	5.5
Methyl acetate		ND		1.0	5.5
Methyl tert-butyl ether		ND		0.54	5.5
Methylcyclohexane		ND J		0.83	5.5
Methylene Chloride		3.7	J	2.5	5.5
Styrene		ND		0.27	5.5
Tetrachloroethene		ND J		0.74	5.5
Toluene		ND J		0.42	5.5
trans-1,2-Dichloroethene		ND J		0.57	5.5
trans-1,3-Dichloropropene		ND		2.4	5.5
Trichloroethene		ND J		1.2	5.5
Trichlorofluoromethane		ND		0.52	5.5

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **FD01111212**

Lab Sample ID: 480-28494-6 | Date Sampled: 11/12/2012 0000
Client Matrix: Solid | % Moisture: 11.4 | Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-91334	Instrument ID:	HP5973F
Prep Method:	5035	Prep Batch:	480-91149	Lab File ID:	F3654.D
Dilution:	1.0			Initial Weight/Volume:	5.14 g
Analysis Date:	11/16/2012 2017			Final Weight/Volume:	5 mL
Prep Date:	11/15/2012 1402				

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Vinyl chloride		ND		0.67	5.5
Xylenes, Total		ND		0.92	11

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	101		64 - 126
Toluene-d8 (Surr)	85		71 - 125
4-Bromofluorobenzene (Surr)	87		72 - 126

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **RB111212**

Lab Sample ID: 480-28494-7
Client Matrix: Water

Date Sampled: 11/12/2012 0745
Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-92175	Instrument ID:	HP5973G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G17157.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	11/21/2012 1254			Final Weight/Volume:	5 mL
Prep Date:	11/21/2012 1254				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		0.82	1.0
1,1,2,2-Tetrachloroethane	ND		0.21	1.0
1,1,2-Trichloroethane	ND		0.23	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.31	1.0
1,1-Dichloroethane	ND		0.38	1.0
1,1-Dichloroethene	ND		0.29	1.0
1,2,4-Trichlorobenzene	ND	J	0.41	1.0
1,2-Dibromo-3-Chloropropane	ND		0.39	1.0
1,2-Dibromoethane	ND		0.73	1.0
1,2-Dichlorobenzene	ND		0.79	1.0
1,2-Dichloroethane	ND		0.21	1.0
1,2-Dichloropropane	ND		0.72	1.0
1,3-Dichlorobenzene	ND		0.78	1.0
1,4-Dichlorobenzene	ND		0.84	1.0
2-Hexanone	ND		1.2	5.0
2-Butanone (MEK)	ND		1.3	10
4-Methyl-2-pentanone (MIBK)	ND		2.1	5.0
Acetone	ND		3.0	10
Benzene	ND		0.41	1.0
Bromodichloromethane	ND		0.39	1.0
Bromoform	ND		0.26	1.0
Bromomethane	ND		0.69	1.0
Carbon disulfide	ND		0.19	1.0
Carbon tetrachloride	ND		0.27	1.0
Chlorobenzene	ND		0.75	1.0
Dibromochloromethane	ND		0.32	1.0
Chloroethane	ND		0.32	1.0
Chloroform	ND		0.34	1.0
Chloromethane	ND	J	0.35	1.0
cis-1,2-Dichloroethene	ND		0.81	1.0
cis-1,3-Dichloropropene	ND		0.36	1.0
Cyclohexane	ND		0.18	1.0
Dichlorodifluoromethane	ND		0.68	1.0
Ethylbenzene	ND		0.74	1.0
Isopropylbenzene	ND		0.79	1.0
Methyl acetate	ND		0.50	1.0
Methyl tert-butyl ether	ND		0.16	1.0
Methylcyclohexane	ND		0.16	1.0
Methylene Chloride	ND		0.44	1.0
Styrene	ND		0.73	1.0
Tetrachloroethene	ND		0.36	1.0
Toluene	ND		0.51	1.0
trans-1,2-Dichloroethene	ND		0.90	1.0
trans-1,3-Dichloropropene	ND		0.37	1.0
Trichloroethene	ND		0.46	1.0
Trichlorofluoromethane	ND		0.88	1.0

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **RB111212**

Lab Sample ID: 480-28494-7
Client Matrix: Water

Date Sampled: 11/12/2012 0745
Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-92175	Instrument ID:	HP5973G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G17157.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	11/21/2012 1254			Final Weight/Volume:	5 mL
Prep Date:	11/21/2012 1254				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		0.90	1.0
Xylenes, Total	ND		0.66	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	108		66 - 137
Toluene-d8 (Surr)	110		71 - 126
4-Bromofluorobenzene (Surr)	104		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **TB111412**

Lab Sample ID: 480-28494-8
Client Matrix: Water

Date Sampled: 11/14/2012 0000
Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-92175	Instrument ID:	HP5973G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G17158.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	11/21/2012 1316			Final Weight/Volume:	5 mL
Prep Date:	11/21/2012 1316				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		0.82	1.0
1,1,2,2-Tetrachloroethane	ND		0.21	1.0
1,1,2-Trichloroethane	ND		0.23	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.31	1.0
1,1-Dichloroethane	ND		0.38	1.0
1,1-Dichloroethene	ND		0.29	1.0
1,2,4-Trichlorobenzene	ND	J	0.41	1.0
1,2-Dibromo-3-Chloropropane	ND		0.39	1.0
1,2-Dibromoethane	ND		0.73	1.0
1,2-Dichlorobenzene	ND		0.79	1.0
1,2-Dichloroethane	ND		0.21	1.0
1,2-Dichloropropane	ND		0.72	1.0
1,3-Dichlorobenzene	ND		0.78	1.0
1,4-Dichlorobenzene	ND		0.84	1.0
2-Hexanone	ND		1.2	5.0
2-Butanone (MEK)	ND		1.3	10
4-Methyl-2-pentanone (MIBK)	ND		2.1	5.0
Acetone	ND		3.0	10
Benzene	ND		0.41	1.0
Bromodichloromethane	ND		0.39	1.0
Bromoform	ND		0.26	1.0
Bromomethane	ND		0.69	1.0
Carbon disulfide	ND		0.19	1.0
Carbon tetrachloride	ND		0.27	1.0
Chlorobenzene	ND		0.75	1.0
Dibromochloromethane	ND		0.32	1.0
Chloroethane	ND		0.32	1.0
Chloroform	ND		0.34	1.0
Chloromethane	ND	J	0.35	1.0
cis-1,2-Dichloroethene	ND		0.81	1.0
cis-1,3-Dichloropropene	ND		0.36	1.0
Cyclohexane	ND		0.18	1.0
Dichlorodifluoromethane	ND		0.68	1.0
Ethylbenzene	ND		0.74	1.0
Isopropylbenzene	ND		0.79	1.0
Methyl acetate	ND		0.50	1.0
Methyl tert-butyl ether	ND		0.16	1.0
Methylcyclohexane	ND		0.16	1.0
Methylene Chloride	ND		0.44	1.0
Styrene	ND		0.73	1.0
Tetrachloroethene	ND		0.36	1.0
Toluene	ND		0.51	1.0
trans-1,2-Dichloroethene	ND		0.90	1.0
trans-1,3-Dichloropropene	ND		0.37	1.0
Trichloroethene	ND		0.46	1.0
Trichlorofluoromethane	ND		0.88	1.0

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **TB111412**

Lab Sample ID: 480-28494-8
Client Matrix: Water

Date Sampled: 11/14/2012 0000
Date Received: 11/14/2012 1200

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-92175	Instrument ID:	HP5973G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G17158.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	11/21/2012 1316			Final Weight/Volume:	5 mL
Prep Date:	11/21/2012 1316				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		0.90	1.0
Xylenes, Total	ND		0.66	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	109		66 - 137
Toluene-d8 (Surr)	113		71 - 126
4-Bromofluorobenzene (Surr)	106		73 - 120

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-03 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-1 | Date Sampled: 11/11/2012 1225
Client Matrix: Solid | % Moisture: 18.0 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92433	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6953.D
Dilution:	1.0			Initial Weight/Volume:	+30.48 g
Analysis Date:	11/23/2012 2011			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		28	J	13	200
bis (2-chloroisopropyl) ether		ND		21	200
2,4,5-Trichlorophenol		ND		44	200
2,4,6-Trichlorophenol		ND		13	200
2,4-Dichlorophenol		ND		11	200
2,4-Dimethylphenol		ND		55	200
2,4-Dinitrophenol		ND		71	400
2,4-Dinitrotoluene		ND		31	200
2,6-Dinitrotoluene		ND		50	200
2-Chloronaphthalene		ND		14	200
2-Chlorophenol		ND		10	200
2-Methylnaphthalene		98	J	2.5	200
2-Methylphenol		ND		6.2	200
2-Nitroaniline		ND		65	400
2-Nitrophenol		ND		9.3	200
3,3'-Dichlorobenzidine		ND		180	200
3-Nitroaniline		ND		47	400
4,6-Dinitro-2-methylphenol		ND		70	400
4-Bromophenyl phenyl ether		ND		64	200
4-Chloro-3-methylphenol		ND		8.3	200
4-Chloroaniline		ND		59	200
4-Chlorophenyl phenyl ether		ND		4.3	200
4-Methylphenol		ND		11	400
4-Nitroaniline		ND		23	400
4-Nitrophenol		ND		49	400
Acenaphthene		140	J	2.4	200
Acenaphthylene		40	J	1.7	200
Acetophenone		ND		10	200
Anthracene		260		5.2	200
Atrazine		ND		9.0	200
Benzaldehyde		ND		22	200
Benzo(a)anthracene		860		3.5	200
Benzo(a)pyrene		1000		4.9	200
Benzo(b)fluoranthene		1300		3.9	200
Benzo(g,h,i)perylene		360	J	2.4	200
Benzo(k)fluoranthene		570		2.2	200
Bis(2-chloroethoxy)methane		ND		11	200
Bis(2-chloroethyl)ether		ND		17	200
Bis(2-ethylhexyl) phthalate		650		65	200
Butyl benzyl phthalate		ND		54	200
Caprolactam		ND		88	200
Carbazole		98	J	2.3	200
Chrysene		750		2.0	200
Di-n-butyl phthalate		ND		70	200
Di-n-octyl phthalate		150	J	4.7	200
Dibenz(a,h)anthracene		230		2.4	200

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-03 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-1 | Date Sampled: 11/11/2012 1225
Client Matrix: Solid | % Moisture: 18.0 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92433	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6953.D
Dilution:	1.0			Initial Weight/Volume:	+30.48 g
Analysis Date:	11/23/2012 2011			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		84	J	2.1	200
Diethyl phthalate		ND		6.1	200
Dimethyl phthalate		ND		5.3	200
Fluoranthene		1400		2.9	200
Fluorene		130	J	4.7	200
Hexachlorobenzene		ND		10	200
Hexachlorobutadiene		ND		10	200
Hexachlorocyclopentadiene		ND		61	200
Hexachloroethane		ND		16	200
Indeno(1,2,3-cd)pyrene		380		5.6	200
Isophorone		ND		10	200
N-Nitrosodi-n-propylamine		ND		16	200
N-Nitrosodiphenylamine		ND		11	200
Naphthalene		830		3.4	200
Nitrobenzene		ND		9.0	200
Pentachlorophenol		ND		69	400
Phenanthrene		870		4.2	200
Phenol		ND		21	200
Pyrene		1100		1.3	200

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	104		39 - 146
2-Fluorobiphenyl	92		37 - 120
2-Fluorophenol	82		18 - 120
Nitrobenzene-d5	91		34 - 132
p-Terphenyl-d14	85		65 - 153
Phenol-d5	93		11 - 120

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-03 (18-20)**

Lab Sample ID: 480-28494-2 | Date Sampled: 11/11/2012 1540
Client Matrix: Solid | % Moisture: 15.3 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92433	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6954.D
Dilution:	1.0			Initial Weight/Volume:	+30.55 g
Analysis Date:	11/23/2012 2035			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		12	J	12	200
bis (2-chloroisopropyl) ether		ND		20	200
2,4,5-Trichlorophenol		ND		43	200
2,4,6-Trichlorophenol		ND		13	200
2,4-Dichlorophenol		ND		10	200
2,4-Dimethylphenol		ND		53	200
2,4-Dinitrophenol		ND		68	380
2,4-Dinitrotoluene		ND		30	200
2,6-Dinitrotoluene		ND		48	200
2-Chloronaphthalene		ND		13	200
2-Chlorophenol		ND		10	200
2-Methylnaphthalene		7.1	J	2.4	200
2-Methylphenol		ND		6.0	200
2-Nitroaniline		ND		63	380
2-Nitrophenol		ND		8.9	200
3,3'-Dichlorobenzidine		ND		170	200
3-Nitroaniline		ND		45	380
4,6-Dinitro-2-methylphenol		ND		68	380
4-Bromophenyl phenyl ether		ND		62	200
4-Chloro-3-methylphenol		ND		8.0	200
4-Chloroaniline		ND		57	200
4-Chlorophenyl phenyl ether		ND		4.2	200
4-Methylphenol		ND		11	380
4-Nitroaniline		ND		22	380
4-Nitrophenol		ND		47	380
Acenaphthene		410		2.3	200
Acenaphthylene		6.2	J	1.6	200
Acetophenone		ND		10	200
Anthracene		75	J	5.0	200
Atrazine		ND		8.7	200
Benzaldehyde		ND		21	200
Benzo(a)anthracene		78	J	3.4	200
Benzo(a)pyrene		160	J	4.7	200
Benzo(b)fluoranthene		200		3.8	200
Benzo(g,h,i)perylene		25	J	2.3	200
Benzo(k)fluoranthene		47	J	2.2	200
Bis(2-chloroethoxy)methane		ND		11	200
Bis(2-chloroethyl)ether		ND		17	200
Bis(2-ethylhexyl) phthalate		130	J	63	200
Butyl benzyl phthalate		ND		53	200
Caprolactam		ND		85	200
Carbazole		170	J	2.3	200
Chrysene		72	J	2.0	200
Di-n-butyl phthalate		ND		68	200
Di-n-octyl phthalate		ND		4.6	200
Dibenz(a,h)anthracene		ND		2.3	200

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-03 (18-20)**

Lab Sample ID: 480-28494-2 | Date Sampled: 11/11/2012 1540
Client Matrix: Solid | % Moisture: 15.3 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92433	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6954.D
Dilution:	1.0			Initial Weight/Volume:	+30.55 g
Analysis Date:	11/23/2012 2035			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		220		2.0	200
Diethyl phthalate		ND		5.9	200
Dimethyl phthalate		ND		5.1	200
Fluoranthene		150	J	2.8	200
Fluorene		190	J	4.5	200
Hexachlorobenzene		ND		9.7	200
Hexachlorobutadiene		ND		10	200
Hexachlorocyclopentadiene		ND		59	200
Hexachloroethane		ND		15	200
Indeno(1,2,3-cd)pyrene		140	J	5.4	200
Isophorone		ND		9.8	200
N-Nitrosodi-n-propylamine		ND		15	200
N-Nitrosodiphenylamine		ND		11	200
Naphthalene		67	J	3.3	200
Nitrobenzene		ND		8.7	200
Pentachlorophenol		ND		67	380
Phenanthrene		220		4.1	200
Phenol		ND		21	200
Pyrene		100	J	1.3	200

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	98		39 - 146
2-Fluorobiphenyl	85		37 - 120
2-Fluorophenol	74		18 - 120
Nitrobenzene-d5	82		34 - 132
p-Terphenyl-d14	82		65 - 153
Phenol-d5	85		11 - 120

Client: ARCADIS U.S. Inc Job Number: 480-28494-1

Client Sample ID: **AW-03 (20-22)**

Lab Sample ID: 480-28494-3 Date Sampled: 11/11/2012 1555
Client Matrix: Solid % Moisture: 16.5 Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92564	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6968.D
Dilution:	1.0			Initial Weight/Volume:	+30.29 g
Analysis Date:	11/24/2012 1620			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		12	200
bis (2-chloroisopropyl) ether		ND		21	200
2,4,5-Trichlorophenol		ND		44	200
2,4,6-Trichlorophenol		ND		13	200
2,4-Dichlorophenol		ND		10	200
2,4-Dimethylphenol		ND		54	200
2,4-Dinitrophenol		ND		70	390
2,4-Dinitrotoluene		ND		31	200
2,6-Dinitrotoluene		ND		49	200
2-Chloronaphthalene		ND		13	200
2-Chlorophenol		ND		10	200
2-Methylnaphthalene		ND		2.4	200
2-Methylphenol		ND		6.2	200
2-Nitroaniline		ND		64	390
2-Nitrophenol		ND		9.2	200
3,3'-Dichlorobenzidine		ND		180	200
3-Nitroaniline		ND		46	390
4,6-Dinitro-2-methylphenol		ND		69	390
4-Bromophenyl phenyl ether		ND		64	200
4-Chloro-3-methylphenol		ND		8.2	200
4-Chloroaniline		ND		59	200
4-Chlorophenyl phenyl ether		ND		4.3	200
4-Methylphenol		ND		11	390
4-Nitroaniline		ND		22	390
4-Nitrophenol		ND		49	390
Acenaphthene		120	J	2.4	200
Acenaphthylene		ND		1.6	200
Acetophenone		ND		10	200
Anthracene		11	J	5.1	200
Atrazine		ND		8.9	200
Benzaldehyde		ND		22	200
Benzo(a)anthracene		ND		3.5	200
Benzo(a)pyrene		96	J	4.8	200
Benzo(b)fluoranthene		130	J	3.9	200
Benzo(g,h,i)perylene		ND		2.4	200
Benzo(k)fluoranthene		7.3	J	2.2	200
Bis(2-chloroethoxy)methane		ND		11	200
Bis(2-chloroethyl)ether		ND		17	200
Bis(2-ethylhexyl) phthalate		160	J	64	200
Butyl benzyl phthalate		ND		54	200
Caprolactam		ND		87	200
Carbazole		97	J	2.3	200
Chrysene		14	J	2.0	200
Di-n-butyl phthalate		ND		69	200
Di-n-octyl phthalate		ND		4.7	200
Dibenz(a,h)anthracene		ND		2.4	200

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-03 (20-22)**

Lab Sample ID: 480-28494-3 | Date Sampled: 11/11/2012 1555
Client Matrix: Solid | % Moisture: 16.5 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92564	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6968.D
Dilution:	1.0			Initial Weight/Volume:	+30.29 g
Analysis Date:	11/24/2012 1620			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		43	J	2.1	200
Diethyl phthalate		ND		6.0	200
Dimethyl phthalate		ND		5.2	200
Fluoranthene		21	J	2.9	200
Fluorene		27	J	4.6	200
Hexachlorobenzene		ND		9.9	200
Hexachlorobutadiene		ND		10	200
Hexachlorocyclopentadiene		ND		61	200
Hexachloroethane		ND		15	200
Indeno(1,2,3-cd)pyrene		ND		5.5	200
Isophorone		ND		10	200
N-Nitrosodi-n-propylamine		ND		16	200
N-Nitrosodiphenylamine		ND		11	200
Naphthalene		42	J	3.3	200
Nitrobenzene		ND		8.9	200
Pentachlorophenol		ND		69	390
Phenanthrene		32	J	4.2	200
Phenol		ND		21	200
Pyrene		19	J	1.3	200

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	103		39 - 146
2-Fluorobiphenyl	84		37 - 120
2-Fluorophenol	72		18 - 120
Nitrobenzene-d5	80		34 - 132
p-Terphenyl-d14	99		65 - 153
Phenol-d5	82		11 - 120

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-04 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-4 | Date Sampled: 11/12/2012 0738
Client Matrix: Solid | % Moisture: 17.8 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92433	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6955.D
Dilution:	5.0			Initial Weight/Volume:	+30.71 g
Analysis Date:	11/23/2012 2059			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		62	1000
bis (2-chloroisopropyl) ether		ND		100	1000
2,4,5-Trichlorophenol		ND		220	1000
2,4,6-Trichlorophenol		ND		66	1000
2,4-Dichlorophenol		ND		53	1000
2,4-Dimethylphenol		ND		270	1000
2,4-Dinitrophenol		ND		350	2000
2,4-Dinitrotoluene		ND		160	1000
2,6-Dinitrotoluene		ND		250	1000
2-Chloronaphthalene		ND		67	1000
2-Chlorophenol		ND		51	1000
2-Methylnaphthalene		66	J	12	1000
2-Methylphenol		ND		31	1000
2-Nitroaniline		ND		320	2000
2-Nitrophenol		ND		46	1000
3,3'-Dichlorobenzidine		ND		880	1000
3-Nitroaniline		ND		230	2000
4,6-Dinitro-2-methylphenol		ND		350	2000
4-Bromophenyl phenyl ether		ND		320	1000
4-Chloro-3-methylphenol		ND		41	1000
4-Chloroaniline		ND		290	1000
4-Chlorophenyl phenyl ether		ND		21	1000
4-Methylphenol		ND		56	2000
4-Nitroaniline		ND		110	2000
4-Nitrophenol		ND		240	2000
Acenaphthene		180	J	12	1000
Acenaphthylene		160	J	8.2	1000
Acetophenone		ND		51	1000
Anthracene		690	J	26	1000
Atrazine		ND		45	1000
Benzaldehyde		ND		110	1000
Benzo(a)anthracene		1400		17	1000
Benzo(a)pyrene		1600		24	1000
Benzo(b)fluoranthene		1900		19	1000
Benzo(g,h,i)perylene		340	J	12	1000
Benzo(k)fluoranthene		1100		11	1000
Bis(2-chloroethoxy)methane		ND		55	1000
Bis(2-chloroethyl)ether		ND		87	1000
Bis(2-ethylhexyl) phthalate		ND		320	1000
Butyl benzyl phthalate		ND		270	1000
Caprolactam		ND		430	1000
Carbazole		110	J	12	1000
Chrysene		1400		10	1000
Di-n-butyl phthalate		ND		350	1000
Di-n-octyl phthalate		ND		23	1000
Dibenz(a,h)anthracene		800	J	12	1000

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-04 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-4 | Date Sampled: 11/12/2012 0738
Client Matrix: Solid | % Moisture: 17.8 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92433	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6955.D
Dilution:	5.0			Initial Weight/Volume:	+30.71 g
Analysis Date:	11/23/2012 2059			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		130	J	10	1000
Diethyl phthalate		ND		30	1000
Dimethyl phthalate		ND		26	1000
Fluoranthene		2600 J		15	1000
Fluorene		270	J	23	1000
Hexachlorobenzene		ND		50	1000
Hexachlorobutadiene		ND		51	1000
Hexachlorocyclopentadiene		ND		300	1000
Hexachloroethane		ND		78	1000
Indeno(1,2,3-cd)pyrene		890	J	28	1000
Isophorone		ND		50	1000
N-Nitrosodi-n-propylamine		ND		79	1000
N-Nitrosodiphenylamine		ND		55	1000
Naphthalene		160	J	17	1000
Nitrobenzene		ND		44	1000
Pentachlorophenol		ND		340	2000
Phenanthrene		1600 J		21	1000
Phenol		ND		110	1000
Pyrene		1900 J		6.5	1000

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	81		39 - 146
2-Fluorobiphenyl	85		37 - 120
2-Fluorophenol	71		18 - 120
Nitrobenzene-d5	77		34 - 132
p-Terphenyl-d14	78		65 - 153
Phenol-d5	80		11 - 120

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-04 (22-22.5)**

Lab Sample ID: 480-28494-5 | Date Sampled: 11/12/2012 0915
Client Matrix: Solid | % Moisture: 16.0 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92433	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6956.D
Dilution:	1.0			Initial Weight/Volume:	+30.90 g
Analysis Date:	11/23/2012 2124			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		ND		12	200
bis (2-chloroisopropyl) ether		ND		20	200
2,4,5-Trichlorophenol		ND		43	200
2,4,6-Trichlorophenol		ND		13	200
2,4-Dichlorophenol		ND		10	200
2,4-Dimethylphenol		99	J	53	200
2,4-Dinitrophenol		ND		68	380
2,4-Dinitrotoluene		ND		30	200
2,6-Dinitrotoluene		ND		48	200
2-Chloronaphthalene		ND		13	200
2-Chlorophenol		ND		9.9	200
2-Methylnaphthalene		ND		2.4	200
2-Methylphenol		ND		6.0	200
2-Nitroaniline		ND		63	380
2-Nitrophenol		ND		8.9	200
3,3'-Dichlorobenzidine		ND		170	200
3-Nitroaniline		ND		45	380
4,6-Dinitro-2-methylphenol		ND		67	380
4-Bromophenyl phenyl ether		ND		62	200
4-Chloro-3-methylphenol		ND		8.0	200
4-Chloroaniline		ND		57	200
4-Chlorophenyl phenyl ether		ND		4.2	200
4-Methylphenol		ND		11	380
4-Nitroaniline		ND		22	380
4-Nitrophenol		ND		47	380
Acenaphthene		13	J	2.3	200
Acenaphthylene		ND		1.6	200
Acetophenone		ND		10	200
Anthracene		ND		5.0	200
Atrazine		ND		8.7	200
Benzaldehyde		ND		21	200
Benzo(a)anthracene		13	J	3.4	200
Benzo(a)pyrene		ND		4.7	200
Benzo(b)fluoranthene		120	J	3.8	200
Benzo(g,h,i)perylene		ND		2.3	200
Benzo(k)fluoranthene		3.3	J	2.1	200
Bis(2-chloroethoxy)methane		ND		11	200
Bis(2-chloroethyl)ether		ND		17	200
Bis(2-ethylhexyl) phthalate		1400		63	200
Butyl benzyl phthalate		ND		52	200
Caprolactam		ND		84	200
Carbazole		ND		2.3	200
Chrysene		5.2	J	2.0	200
Di-n-butyl phthalate		ND		67	200
Di-n-octyl phthalate		ND		4.6	200
Dibenz(a,h)anthracene		ND		2.3	200

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **AW-04 (22-22.5)**

Lab Sample ID: 480-28494-5 | Date Sampled: 11/12/2012 0915
Client Matrix: Solid | % Moisture: 16.0 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92433	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6956.D
Dilution:	1.0			Initial Weight/Volume:	+30.90 g
Analysis Date:	11/23/2012 2124			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		8.0	J	2.0	200
Diethyl phthalate		ND		5.9	200
Dimethyl phthalate		ND		5.1	200
Fluoranthene		3.9	J	2.8	200
Fluorene		8.3	J	4.5	200
Hexachlorobenzene		ND		9.7	200
Hexachlorobutadiene		ND		10	200
Hexachlorocyclopentadiene		ND		59	200
Hexachloroethane		ND		15	200
Indeno(1,2,3-cd)pyrene		ND		5.4	200
Isophorone		ND		9.8	200
N-Nitrosodi-n-propylamine		ND		15	200
N-Nitrosodiphenylamine		ND		11	200
Naphthalene		1200		3.2	200
Nitrobenzene		ND		8.7	200
Pentachlorophenol		ND		67	380
Phenanthrene		11	J	4.1	200
Phenol		ND		21	200
Pyrene		ND		1.3	200

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	99		39 - 146
2-Fluorobiphenyl	83		37 - 120
2-Fluorophenol	68		18 - 120
Nitrobenzene-d5	77		34 - 132
p-Terphenyl-d14	81		65 - 153
Phenol-d5	79		11 - 120

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **FD01111212**

Lab Sample ID: 480-28494-6 | Date Sampled: 11/12/2012 0000
Client Matrix: Solid | % Moisture: 11.4 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92194	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6913.D
Dilution:	5.0			Initial Weight/Volume:	+30.46 g
Analysis Date:	11/21/2012 2039			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Biphenyl		77	J	58	950
bis (2-chloroisopropyl) ether		ND		98	950
2,4,5-Trichlorophenol		ND		200	950
2,4,6-Trichlorophenol		ND		62	950
2,4-Dichlorophenol		ND		49	950
2,4-Dimethylphenol		ND		250	950
2,4-Dinitrophenol		ND	J	330	1800
2,4-Dinitrotoluene		ND		150	950
2,6-Dinitrotoluene		ND		230	950
2-Chloronaphthalene		ND		63	950
2-Chlorophenol		ND		48	950
2-Methylnaphthalene		280	J	11	950
2-Methylphenol		ND		29	950
2-Nitroaniline		ND		300	1800
2-Nitrophenol		ND		43	950
3,3'-Dichlorobenzidine		ND		820	950
3-Nitroaniline		ND		220	1800
4,6-Dinitro-2-methylphenol		ND		320	1800
4-Bromophenyl phenyl ether		ND		300	950
4-Chloro-3-methylphenol		ND		39	950
4-Chloroaniline		ND		280	950
4-Chlorophenyl phenyl ether		ND		20	950
4-Methylphenol		ND		52	1800
4-Nitroaniline		ND		100	1800
4-Nitrophenol		ND		230	1800
Acenaphthene		970		11	950
Acenaphthylene		200	J	7.7	950
Acetophenone		ND		48	950
Anthracene		2000		24	950
Atrazine		ND		42	950
Benzaldehyde		ND		100	950
Benzo(a)anthracene		3700		16	950
Benzo(a)pyrene		3700		23	950
Benzo(b)fluoranthene		4500		18	950
Benzo(g,h,i)perylene		1300		11	950
Benzo(k)fluoranthene		2300		10	950
Bis(2-chloroethoxy)methane		ND		51	950
Bis(2-chloroethyl)ether		ND		81	950
Bis(2-ethylhexyl) phthalate		ND		300	950
Butyl benzyl phthalate		ND		250	950
Caprolactam		ND		410	950
Carbazole		620	J	11	950
Chrysene		3300		9.4	950
Di-n-butyl phthalate		ND		320	950
Di-n-octyl phthalate		ND		22	950
Dibenz(a,h)anthracene		940	J	11	950

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **FD01111212**

Lab Sample ID: 480-28494-6 | Date Sampled: 11/12/2012 0000
Client Matrix: Solid | % Moisture: 11.4 | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92194	Instrument ID:	HP5973V
Prep Method:	3550B	Prep Batch:	480-91320	Lab File ID:	V6913.D
Dilution:	5.0			Initial Weight/Volume:	+30.46 g
Analysis Date:	11/21/2012 2039			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 0828			Injection Volume:	1 uL

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Dibenzofuran		650	J	9.8	950
Diethyl phthalate		ND		28	950
Dimethyl phthalate		ND		24	950
Fluoranthene		8100 J		14	950
Fluorene		1100 J		22	950
Hexachlorobenzene		ND		47	950
Hexachlorobutadiene		ND		48	950
Hexachlorocyclopentadiene		ND		280	950
Hexachloroethane		ND		73	950
Indeno(1,2,3-cd)pyrene		1600		26	950
Isophorone		ND		47	950
N-Nitrosodi-n-propylamine		ND		74	950
N-Nitrosodiphenylamine		ND		51	950
Naphthalene		360	J	16	950
Nitrobenzene		ND		42	950
Pentachlorophenol		ND		320	1800
Phenanthrene		6800 J		20	950
Phenol		ND		99	950
Pyrene		7100 J		6.1	950

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	117		39 - 146
2-Fluorobiphenyl	116		37 - 120
2-Fluorophenol	100		18 - 120
Nitrobenzene-d5	109		34 - 132
p-Terphenyl-d14	150		65 - 153
Phenol-d5	118		11 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **RB111212**

Lab Sample ID: 480-28494-7
Client Matrix: Water

Date Sampled: 11/12/2012 0745
Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92462	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-91439	Lab File ID:	X2352.D
Dilution:	1.0			Initial Weight/Volume:	1000 mL
Analysis Date:	11/23/2012 2011			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 1428			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Biphenyl	ND		0.65	5.0
bis (2-chloroisopropyl) ether	ND		0.52	5.0
2,4,5-Trichlorophenol	ND		0.48	5.0
2,4,6-Trichlorophenol	ND		0.61	5.0
2,4-Dichlorophenol	ND		0.51	5.0
2,4-Dimethylphenol	ND		0.50	5.0
2,4-Dinitrophenol	ND		2.2	10
2,4-Dinitrotoluene	ND		0.45	5.0
2,6-Dinitrotoluene	ND		0.40	5.0
2-Chloronaphthalene	ND		0.46	5.0
2-Chlorophenol	ND		0.53	5.0
2-Methylnaphthalene	ND		0.60	5.0
2-Methylphenol	ND		0.40	5.0
2-Nitroaniline	ND		0.42	10
2-Nitrophenol	ND		0.48	5.0
3,3'-Dichlorobenzidine	ND		0.40	5.0
3-Nitroaniline	ND		0.48	10
4,6-Dinitro-2-methylphenol	ND		2.2	10
4-Bromophenyl phenyl ether	ND		0.45	5.0
4-Chloro-3-methylphenol	ND		0.45	5.0
4-Chloroaniline	ND		0.59	5.0
4-Chlorophenyl phenyl ether	ND		0.35	5.0
4-Methylphenol	ND		0.36	10
4-Nitroaniline	ND		0.25	10
4-Nitrophenol	ND		1.5	10
Acenaphthene	ND		0.41	5.0
Acenaphthylene	ND		0.38	5.0
Acetophenone	ND		0.54	5.0
Anthracene	ND		0.28	5.0
Atrazine	ND		0.46	5.0
Benzaldehyde	ND		0.27	5.0
Benzo(a)anthracene	ND		0.36	5.0
Benzo(a)pyrene	ND		0.47	5.0
Benzo(b)fluoranthene	ND		0.34	5.0
Benzo(g,h,i)perylene	ND		0.35	5.0
Benzo(k)fluoranthene	ND		0.73	5.0
Bis(2-chloroethoxy)methane	ND		0.35	5.0
Bis(2-chloroethyl)ether	ND		0.40	5.0
Bis(2-ethylhexyl) phthalate	4.4	J	1.8	5.0
Butyl benzyl phthalate	ND		0.42	5.0
Caprolactam	ND		2.2	5.0
Carbazole	ND		0.30	5.0
Chrysene	ND		0.33	5.0
Di-n-butyl phthalate	ND		0.31	5.0
Di-n-octyl phthalate	ND		0.47	5.0
Dibenz(a,h)anthracene	ND		0.42	5.0

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **RB111212**

Lab Sample ID: 480-28494-7 | Date Sampled: 11/12/2012 0745
Client Matrix: Water | Date Received: 11/14/2012 1200

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-92462	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-91439	Lab File ID:	X2352.D
Dilution:	1.0			Initial Weight/Volume:	1000 mL
Analysis Date:	11/23/2012 2011			Final Weight/Volume:	1 mL
Prep Date:	11/16/2012 1428			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dibenzofuran	ND		0.51	10
Diethyl phthalate	ND		0.22	5.0
Dimethyl phthalate	ND		0.36	5.0
Fluoranthene	ND		0.40	5.0
Fluorene	ND		0.36	5.0
Hexachlorobenzene	ND		0.51	5.0
Hexachlorobutadiene	ND		0.68	5.0
Hexachlorocyclopentadiene	ND		0.59	5.0
Hexachloroethane	ND		0.59	5.0
Indeno(1,2,3-cd)pyrene	ND		0.47	5.0
Isophorone	ND		0.43	5.0
N-Nitrosodi-n-propylamine	ND		0.54	5.0
N-Nitrosodiphenylamine	ND		0.51	5.0
Naphthalene	ND		0.76	5.0
Nitrobenzene	ND		0.29	5.0
Pentachlorophenol	ND		2.2	10
Phenanthrene	ND		0.44	5.0
Phenol	ND		0.39	5.0
Pyrene	ND		0.34	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	112		52 - 132
2-Fluorobiphenyl	94		48 - 120
2-Fluorophenol	45		20 - 120
Nitrobenzene-d5	91		46 - 120
p-Terphenyl-d14	86		67 - 150
Phenol-d5	33		16 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **AW-03 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-1
Client Matrix: Solid
% Moisture: 18.0
Date Sampled: 11/11/2012 1225
Date Received: 11/14/2012 1200

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-91963	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-91171	Lab File ID:	I2111712A-9.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4734 g
Analysis Date:	11/18/2012 0010			Final Weight/Volume:	50 mL
Prep Date:	11/16/2012 1030				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		10100		5.7	12.9
Antimony		97.0 J		0.51	19.3
Arsenic		15.4		0.51	2.6
Barium		81.0 J		0.14	0.64
Beryllium		0.59		0.036	0.26
Cadmium		0.45		0.039	0.26
Calcium		28900	B	4.2	64.4
Chromium		21.0		0.26	0.64
Cobalt		5.3		0.064	0.64
Copper		25.6		0.27	1.3
Iron		12100	B	1.4	12.9
Lead		949		0.31	1.3
Magnesium		10500		1.2	25.7
Manganese		323	B	0.041	0.26
Nickel		13.0		0.30	6.4
Potassium		1410 J		25.7	38.6
Selenium		ND		0.51	5.1
Silver		ND		0.26	0.64
Sodium		487		16.7	180
Thallium		ND		0.39	7.7
Vanadium		28.5		0.14	0.64
Zinc		171 J		0.20	2.6

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-91178	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-91098	Lab File ID:	J11152S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.5888 g
Analysis Date:	11/15/2012 1520			Final Weight/Volume:	50 mL
Prep Date:	11/15/2012 1215				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.092 J		0.010	0.025

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **AW-03 (18-20)**

Lab Sample ID: 480-28494-2
Client Matrix: Solid
% Moisture: 15.3
Date Sampled: 11/11/2012 1540
Date Received: 11/14/2012 1200

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-91963	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-91171	Lab File ID:	I2111712A-9.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5491 g
Analysis Date:	11/18/2012 0012			Final Weight/Volume:	50 mL
Prep Date:	11/16/2012 1030				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		4190		4.7	10.7
Antimony		ND J		0.43	16.1
Arsenic		2.8		0.43	2.1
Barium		48.9 J		0.12	0.54
Beryllium		0.20	J	0.030	0.21
Cadmium		0.25		0.032	0.21
Calcium		53300	B	3.5	53.7
Chromium		6.7		0.21	0.54
Cobalt		3.7		0.054	0.54
Copper		8.4		0.23	1.1
Iron		8100	B	1.2	10.7
Lead		9.8		0.26	1.1
Magnesium		25100		1.0	21.5
Manganese		325	B	0.034	0.21
Nickel		7.9		0.25	5.4
Potassium		1160 J		21.5	32.2
Selenium		ND		0.43	4.3
Silver		ND		0.21	0.54
Sodium		328		14.0	150
Thallium		ND		0.32	6.4
Vanadium		11.6		0.12	0.54
Zinc		58.6 J		0.16	2.1

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-91178	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-91098	Lab File ID:	J11152S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.6017 g
Analysis Date:	11/15/2012 1521			Final Weight/Volume:	50 mL
Prep Date:	11/15/2012 1215				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND J		0.0095	0.024

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **AW-03 (20-22)**

Lab Sample ID: 480-28494-3
Client Matrix: Solid
% Moisture: 16.5
Date Sampled: 11/11/2012 1555
Date Received: 11/14/2012 1200

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-91963	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-91171	Lab File ID:	I2111712A-9.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4630 g
Analysis Date:	11/18/2012 0015			Final Weight/Volume:	50 mL
Prep Date:	11/16/2012 1030				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		6220		5.7	12.9
Antimony		ND J		0.52	19.4
Arsenic		3.2		0.52	2.6
Barium		64.6 J		0.14	0.65
Beryllium		0.30		0.036	0.26
Cadmium		0.22	J	0.039	0.26
Calcium		61400	B	4.3	64.7
Chromium		9.9		0.26	0.65
Cobalt		5.3		0.065	0.65
Copper		11.7		0.27	1.3
Iron		11200	B	1.4	12.9
Lead		11.3		0.31	1.3
Magnesium		26500		1.2	25.9
Manganese		386	B	0.041	0.26
Nickel		11.3		0.30	6.5
Potassium		1740 J		25.9	38.8
Selenium		ND		0.52	5.2
Silver		ND		0.26	0.65
Sodium		394		16.8	181
Thallium		ND		0.39	7.8
Vanadium		16.2		0.14	0.65
Zinc		53.3 J		0.20	2.6

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-91178	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-91098	Lab File ID:	J11152S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.6278 g
Analysis Date:	11/15/2012 1523			Final Weight/Volume:	50 mL
Prep Date:	11/15/2012 1215				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND J		0.0093	0.023

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **AW-04 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-4
Client Matrix: Solid
% Moisture: 17.8
Date Sampled: 11/12/2012 0738
Date Received: 11/14/2012 1200

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-91963	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-91171	Lab File ID:	I2111712A-9.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5312 g
Analysis Date:	11/18/2012 0017			Final Weight/Volume:	50 mL
Prep Date:	11/16/2012 1030				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		6000 J		5.0	11.5
Antimony		ND J		0.46	17.2
Arsenic		6.2		0.46	2.3
Barium		55.8 J		0.13	0.57
Beryllium		0.47		0.032	0.23
Cadmium		0.38		0.034	0.23
Calcium		103000	B	3.8	57.3
Chromium		8.8		0.23	0.57
Cobalt		4.9		0.057	0.57
Copper		17.8		0.24	1.1
Iron		12000	B	1.3	11.5
Lead		45.5		0.27	1.1
Magnesium		38600 J		1.1	22.9
Manganese		525 J	B	0.037	0.23
Nickel		13.4		0.26	5.7
Potassium		1060 J		22.9	34.4
Selenium		ND		0.46	4.6
Silver		ND		0.23	0.57
Sodium		252		14.9	160
Thallium		ND		0.34	6.9
Vanadium		12.0		0.13	0.57
Zinc		70.7 J		0.18	2.3

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-91178	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-91098	Lab File ID:	J11152S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.6548 g
Analysis Date:	11/15/2012 1459			Final Weight/Volume:	50 mL
Prep Date:	11/15/2012 1215				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.035 J		0.0090	0.022

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **AW-04 (22-22.5)**

Lab Sample ID: 480-28494-5
Client Matrix: Solid
% Moisture: 16.0
Date Sampled: 11/12/2012 0915
Date Received: 11/14/2012 1200

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-91941	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-91171	Lab File ID:	I2111912B-9.asc
Dilution:	1.0			Initial Weight/Volume:	+0.4742 g
Analysis Date:	11/19/2012 2239			Final Weight/Volume:	50 mL
Prep Date:	11/16/2012 1030				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		9160		5.5	12.6
Antimony		ND J		0.50	18.8
Arsenic		4.2		0.50	2.5
Barium		91.0 J		0.14	0.63
Beryllium		0.47		0.035	0.25
Cadmium		0.27		0.038	0.25
Calcium		83900	B	4.1	62.8
Chromium		14.0		0.25	0.63
Cobalt		7.5		0.063	0.63
Copper		16.7		0.26	1.3
Iron		16900	B	1.4	12.6
Lead		15.9		0.30	1.3
Magnesium		36300		1.2	25.1
Manganese		555	B	0.040	0.25
Nickel		16.4		0.29	6.3
Potassium		2550J		25.1	37.7
Selenium		ND		0.50	5.0
Silver		ND		0.25	0.63
Sodium		288		16.3	176
Thallium		ND		0.38	7.5
Vanadium		19.5		0.14	0.63
Zinc		60.2 J		0.19	2.5

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-91178	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-91098	Lab File ID:	J11152S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.6055 g
Analysis Date:	11/15/2012 1506			Final Weight/Volume:	50 mL
Prep Date:	11/15/2012 1215				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		ND J		0.0096	0.024

Client: ARCADIS U.S. Inc

Job Number: 480-28494-1

Client Sample ID: **FD01111212**

Lab Sample ID: 480-28494-6
Client Matrix: Solid
% Moisture: 11.4
Date Sampled: 11/12/2012 0000
Date Received: 11/14/2012 1200

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-91963	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-91171	Lab File ID:	I2111712A-9.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5079 g
Analysis Date:	11/18/2012 0022			Final Weight/Volume:	50 mL
Prep Date:	11/16/2012 1030				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		10500 J		4.9	11.1
Antimony		ND J		0.44	16.7
Arsenic		5.4		0.44	2.2
Barium		143 J		0.12	0.56
Beryllium		1.9		0.031	0.22
Cadmium		0.40		0.033	0.22
Calcium		90500 J	B	3.7	55.6
Chromium		7.9		0.22	0.56
Cobalt		4.9		0.056	0.56
Copper		19.6		0.23	1.1
Lead		47.1		0.27	1.1
Magnesium		17900 J		1.0	22.2
Manganese		950 J	B	0.036	0.22
Nickel		14.9		0.26	5.6
Potassium		1110 J		22.2	33.3
Selenium		1.1	J	0.44	4.4
Silver		ND		0.22	0.56
Sodium		423		14.4	156
Thallium		ND		0.33	6.7
Vanadium		11.1		0.12	0.56
Zinc		74.7 J		0.17	2.2

Analysis Method:	6010B	Analysis Batch:	480-91941	Instrument ID:	ICAP2
Prep Method:	3050B	Prep Batch:	480-91171	Lab File ID:	I2111912B-9.asc
Dilution:	1.0			Initial Weight/Volume:	+0.5079 g
Analysis Date:	11/19/2012 2246			Final Weight/Volume:	50 mL
Prep Date:	11/16/2012 1030				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Iron		12600 J	B	1.2	11.1

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	480-91434	Instrument ID:	LEEMAN3
Prep Method:	7471A	Prep Batch:	480-91308	Lab File ID:	J11162S1.PRN
Dilution:	1.0			Initial Weight/Volume:	+0.6059 g
Analysis Date:	11/16/2012 1143			Final Weight/Volume:	50 mL
Prep Date:	11/16/2012 0845				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.062 J		0.0091	0.022

Client: ARCADIS U.S. Inc | Job Number: 480-28494-1

Client Sample ID: **RB111212**

Lab Sample ID: 480-28494-7 | Date Sampled: 11/12/2012 0745
Client Matrix: Water | Date Received: 11/14/2012 1200

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-91749	Instrument ID:	ICAP2
Prep Method:	3005A	Prep Batch:	480-91096	Lab File ID:	I2111612B-5.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/16/2012 2217			Final Weight/Volume:	50 mL
Prep Date:	11/15/2012 1200				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	0.18	J	0.060	0.20
Antimony	ND		0.0068	0.020
Arsenic	ND		0.0056	0.010
Beryllium	ND		0.00030	0.0020
Cadmium	ND		0.00050	0.0010
Calcium	1.2		0.10	0.50
Chromium	ND		0.0010	0.0040
Cobalt	ND		0.00063	0.0040
Copper	ND		0.0016	0.010
Iron	0.51		0.019	0.050
Lead	ND		0.0030	0.0050
Magnesium	0.45		0.043	0.20
Manganese	0.0074	B	0.00040	0.0030
Nickel	ND		0.0013	0.010
Potassium	0.15	J	0.10	0.50
Selenium	ND		0.0087	0.015
Silver	ND		0.0017	0.0030
Sodium	1.7		0.32	1.0
Thallium	ND		0.010	0.020
Vanadium	ND		0.0015	0.0050
Zinc	0.0039	J	0.0015	0.010

Analysis Method:	6010B	Analysis Batch:	480-92843	Instrument ID:	ICAP2
Prep Method:	3005A	Prep Batch:	480-91096	Lab File ID:	I2112612B-16.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/27/2012 0043			Final Weight/Volume:	50 mL
Prep Date:	11/15/2012 1200				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Barium	0.0028		0.00070	0.0020

7470A Mercury (CVAA)

Analysis Method:	7470A	Analysis Batch:	480-91151	Instrument ID:	LEEMAN2
Prep Method:	7470A	Prep Batch:	480-91040	Lab File ID:	H11152W2.PRN
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/15/2012 1234			Final Weight/Volume:	50 mL
Prep Date:	11/15/2012 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Mercury	ND		0.00012	0.00020

General Chemistry

Client Sample ID: **AW-03 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-1 Date Sampled: 11/11/2012 1225
Client Matrix: Solid % Moisture: 18.0 Date Received: 11/14/2012 1200

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	0.98	J	mg/Kg	0.59	1.2	1.0	9012A
Analysis Batch: 480-92626	Analysis Date: 11/25/2012 2337						DryWt Corrected: Y
Prep Batch: 480-92597	Prep Date: 11/24/2012 1330						
Cyanide, Free	0.52	J	mg/Kg	0.13	2.5	1.0	9016
Analysis Batch: 460-136556	Analysis Date: 11/21/2012 1230						DryWt Corrected: Y
Prep Batch: 460-136505	Prep Date: 11/21/2012 0630						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	18		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N
Percent Solids	82		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N

General Chemistry

Client Sample ID: **AW-03 (18-20)**

Lab Sample ID: 480-28494-2 Date Sampled: 11/11/2012 1540
Client Matrix: Solid % Moisture: 15.3 Date Received: 11/14/2012 1200

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	0.82	J	mg/Kg	0.54	1.1	1.0	9012A
Analysis Batch: 480-92626	Analysis Date: 11/25/2012 2338						DryWt Corrected: Y
Prep Batch: 480-92597	Prep Date: 11/24/2012 1330						
Cyanide, Free	ND		mg/Kg	0.12	2.5	1.0	9016
Analysis Batch: 460-136556	Analysis Date: 11/21/2012 1230						DryWt Corrected: Y
Prep Batch: 460-136505	Prep Date: 11/21/2012 0630						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	15		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N
Percent Solids	85		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N

General Chemistry

Client Sample ID: **AW-03 (20-22)**

Lab Sample ID: 480-28494-3 Date Sampled: 11/11/2012 1555
Client Matrix: Solid % Moisture: 16.5 Date Received: 11/14/2012 1200

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	0.87	J	mg/Kg	0.55	1.1	1.0	9012A
Analysis Batch: 480-92626	Analysis Date: 11/25/2012 2339						DryWt Corrected: Y
Prep Batch: 480-92597	Prep Date: 11/24/2012 1330						
Cyanide, Free	0.27	J	mg/Kg	0.13	2.6	1.0	9016
Analysis Batch: 460-136556	Analysis Date: 11/21/2012 1230						DryWt Corrected: Y
Prep Batch: 460-136505	Prep Date: 11/21/2012 0630						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	16		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N
Percent Solids	84		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N

General Chemistry

Client Sample ID: **AW-04 (4-8 COMPOSITE)**

Lab Sample ID: 480-28494-4 Date Sampled: 11/12/2012 0738

Client Matrix: Solid % Moisture: 17.8 Date Received: 11/14/2012 1200

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	3.8		mg/Kg	0.56	1.2	1.0	9012A
Analysis Batch: 480-92626	Analysis Date: 11/25/2012 2344						DryWt Corrected: Y
Prep Batch: 480-92597	Prep Date: 11/24/2012 1330						
Cyanide, Free	0.13	J	mg/Kg	0.13	2.6	1.0	9016
Analysis Batch: 460-136556	Analysis Date: 11/21/2012 1230						DryWt Corrected: Y
Prep Batch: 460-136505	Prep Date: 11/21/2012 0630						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	18		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N
Percent Solids	82		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N

General Chemistry

Client Sample ID: **AW-04 (22-22.5)**

Lab Sample ID: 480-28494-5 Date Sampled: 11/12/2012 0915
Client Matrix: Solid % Moisture: 16.0 Date Received: 11/14/2012 1200

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	0.81	J	mg/Kg	0.56	1.2	1.0	9012A
Analysis Batch: 480-92626	Analysis Date: 11/25/2012 2339						DryWt Corrected: Y
Prep Batch: 480-92597	Prep Date: 11/24/2012 1330						
Cyanide, Free	0.14	J	mg/Kg	0.13	2.6	1.0	9016
Analysis Batch: 460-136556	Analysis Date: 11/21/2012 1230						DryWt Corrected: Y
Prep Batch: 460-136505	Prep Date: 11/21/2012 0630						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	16		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N
Percent Solids	84		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N

General Chemistry

Client Sample ID: **FD01111212**

Lab Sample ID: 480-28494-6 Date Sampled: 11/12/2012 0000
Client Matrix: Solid % Moisture: 11.4 Date Received: 11/14/2012 1200

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide	2.4		mg/Kg	0.52	1.1	1.0	9012A
Analysis Batch: 480-92778	Analysis Date: 11/26/2012 1859						DryWt Corrected: Y
Prep Batch: 480-92761	Prep Date: 11/26/2012 1540						
Cyanide, Free	0.18	J	mg/Kg	0.12	2.4	1.0	9016
Analysis Batch: 460-136556	Analysis Date: 11/21/2012 1230						DryWt Corrected: Y
Prep Batch: 460-136505	Prep Date: 11/21/2012 0630						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	11		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N
Percent Solids	89		%	0.10	0.10	1.0	Moisture
Analysis Batch: 480-91231	Analysis Date: 11/15/2012 1722						DryWt Corrected: N

General Chemistry

Client Sample ID: **RB111212**

Lab Sample ID: 480-28494-7 Date Sampled: 11/12/2012 0745
Client Matrix: Water Date Received: 11/14/2012 1200

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	ND	J ~~* A~~	mg/L	0.0050	0.020	1.0	9012A
Analysis Batch: 480-92629	Analysis Date: 11/26/2012 0215						
Prep Batch: 480-92374	Prep Date: 11/22/2012 0334						
~~Cyanide, Total~~	~~ND~~	~~H~~	~~mg/L~~	~~0.0050~~	~~0.020~~	~~1.0~~	~~9012A~~
~~Run Type: RA~~	~~Analysis Batch: 480-93171~~	~~Analysis Date: 11/28/2012 1309~~					
	~~Prep Batch: 480-93046~~	~~Prep Date: 11/28/2012 0155~~					
Cyanide, Free	0.56	J	ug/L	0.54	5.0	1.0	9016
Analysis Batch: 460-136556	Analysis Date: 11/21/2012 1230						
Prep Batch: 460-136509	Prep Date: 11/21/2012 0630						

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Data Usability Summary Report (DUSR)

BUFFALO, NEW YORK

Volatile, Semivolatile, Metals, and Miscellaneous Analyses

SDG #480-24234

Analyses Performed By:
TestAmerica Laboratories
Buffalo, New York

Report #17413R
Review Level: Tier III
Project: B0023310.0000.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #480-24234 for samples collected in association with the National Fuel Wilkenson Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
AW-02	480-24234-1	Ground water	8/22/2012		X	X		X	X
AW-01	480-24234-2	Ground water	8/22/2012		X	X		X	X
DUP-082212	480-24234-3	Ground water	8/22/2012	AW-01	X	X		X	X
TRIP BLANK	480-24234-4	Water	8/22/2012		X	X		X	X

Note:

1. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location AW-02.
2. Miscellaneous parameters include total and free cyanide.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 8260B and 8270C as referenced in NYSDEC-ASP. Data were reviewed in accordance with USEPA Region II SOP HW-24 - Validating Volatile Organic Compounds by SW-846 Method 8260B of October 2006 and New York State ASP 2005.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260B	Water	14 days from collection to analysis (7 days if unpreserved)	Cool to 4°C±2°C; preserved to a pH of less than 2 s.u.
	Soil	14 days from collection to analysis	Cool to 4°C±2°C.

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
DUP-082212	CCV %D	Bromomethane	-36.2%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 15% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD >90%	Non-detect	R
		Detect	J
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD exhibited acceptable recoveries and RPD between the MS/MSD recoveries.

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-01/DUP-082212	Benzene	0.58 J	0.55 J	AC

AC - Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate(LCSD)					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS)		X		X	
Matrix Spike Duplicate(MSD)		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present				X	

VOCs: SW-846 8260B	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
E. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270C	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cooled @ 4°C ± 2°C
	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cooled @ 4°C ± 2°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/ Continuing	Compound	Criteria
AW-02 AW-01 DUP-082212	CCV %D	2,4-Dinitrophenol	22.2%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 15% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD >90%	Non-detect	R
		Detect	J
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

Sample locations associated with surrogates exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Surrogate	Recovery
AW-02 AW-01 DUP-082212	2,4,6-Tribromophenol	AC
	2-Fluorobiphenyl	AC
	2-Fluorophenol	AC
	Nitrobenzene-d5	AC
	p-Terphenyl-d14	<LL but >10%
	Phenol-d5	AC

LL Lower control limit
AC Acceptable

The criteria used to evaluate the surrogate recoveries are presented in the following table. In the case of a surrogate deviation, the sample results associated with the deviant fraction are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	No Action
	Detect	J
< LL but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Surrogates diluted below the calibration curve due to the high concentration of a target compounds	Non-detect	J[1]
	Detect	

[1] A more concentrated analysis was not performed with surrogate compounds within the calibration range; therefore, no determination of extraction efficiency could be made.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD exhibited acceptable recoveries and RPD between the MS/MSD recoveries.

8. Laboratory Control Sample (LCS/) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-01/DUP-082212	Acenaphthene	2.2 J	2 J	AC
	Di-n-octyl phthalate	1.9 J	4.7 U	AC

AC - Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270C	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
D. Method blanks		X		X	
E. Equipment blanks					X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X	X		
Dilution Factor		X		X	
Moisture Content					X
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
F. Reconstructed ion chromatograms		X		X	
G. Quantitation Reports		X		X	
H. RT of sample compounds within the established RT windows		X		X	
I. Transcription/calculation errors present				X	
J. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6000/7000 and 9012A/9016. Data were reviewed in accordance with USEPA National Functional Guidelines of July 2002.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010B	Water	180 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to 4°C±2°C.
SW-846 7470	Water	28 days from collection to analysis	Cool to 4°C±2°C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool to 4°C±2°C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. Therefore, sample results greater than the BAL resulted in the removal of the laboratory qualifier (B). No other qualification of the sample results was required.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All CRDL standard recoveries were within control limits.

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analyte present in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
AW-02	Silver	126%	128%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
	Detect	J
MS/MSD percent recovery <30%	Non-detect	R
	Detect	J
MS/MSD percent recovery >125%	Non-detect	No Action
	Detect	J

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
AW-01/DUP-082212	Aluminum	0.071 J	0.086 J	AC
	Barium	0.052	0.052	0.0 %
	Cadmium	0.001 U	0.00053 J	AC
	Calcium	294	301	2.3 %
	Cobalt	0.004 U	0.00071 J	AC
	Copper	0.01 U	0.0022 J	AC
	Iron	15.1	15.3	1.3 %
	Magnesium	19.6	19.7	0.5 %
	Manganese	0.77	0.78	1.2 %
	Potassium	9.7	9.7	0.0 %
	Sodium	498	504	1.1 %
	Vanadium	0.0041 J	0.0047 J	AC
	Zinc	0.0034 J	0.0026 J	AC

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

All serial dilutions were within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6000/7000	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP) Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X	X		
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution		X		X	
Reporting Limit Verification		X		X	
Raw Data		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard		X		X	
ICP Interference Check		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%R Percent recovery
RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Total/Free Cyanide by SW-846 9012A/9016	Water	14 days from collection to analysis	Cooled @ 4°C ± 2; preserved to a pH of greater than 12.
	Soil		Cooled @ 4°C ± 2.

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All analytes associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the analytes listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (J) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analyte	Sample Result	Qualification
AW-02	Total Cyanide	Detected sample results <RL and <BAL	"UB" at the RL
AW-01 DUP-082212	Free Cyanide	Detected sample results >RL and <BAL	"UB" at detected sample concentration

RL = reporting limit

3. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all initial calibration verification standard recoveries were within control limits.

All calibration standard recoveries were within the control limit.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analyte present in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
AW-02	Total Cyanide	49%	AC

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
	Detect	J
MS/MSD percent recovery <30%	Non-detect	R
	Detect	J
MS/MSD percent recovery >125%	Non-detect	No Action
	Detect	J

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate

sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-01/DUP-082212	Cyanide, Total	0.088	0.063	AC

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All LCS recoveries were within control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SW-846 9012A and 9016	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks					X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor					X
Moisture Content		X		X	
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculation errors present				X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference

SAMPLE COMPLIANCE REPORT

Sample Delivery Group (SDG)	Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
					VOC	SVOC	PCB	MET	MISC	
480-23453	8/22/2012	SW846	AW-02	Water	yes	yes	--	yes	No	MISC – Method Blank, MS %R
	8/22/2012	SW846	AW-01	Water	yes	yes	--	yes	No	MISC – Method Blank, MS %R
	8/22/2012	SW846	DUP-082212	Water	No	yes	--	yes	No	VOC – CCAL %D MISC – Method Blank, MS %R
	8/22/2012	SW846	TRIP BLANK	Water	yes	--	--	--	--	MET – MS/MSD %R, Ser Dil., Field dup.

1 Samples which are compliant with no added validation qualifiers are listed as "yes". Samples which are non-compliant or which have added qualifiers are listed as "no". A "no" designation does not necessarily indicate that the data have been rejected or are otherwise unusable.

VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE: 

DATE: October 3, 2012

PEER REVIEW: Dennis Capria

DATE: October 5, 2012

CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes☐ No☐

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: ARCADIS/National Fuel	Project Manager: Scott Doolin	Date: 8/22/12	Chain of Custody Number: 232111
Address: 295 Woodcliff Drive	Telephone Number (Area Code)/Fax Number: 585 315-6711-9456	Lab Number	Page 1 of 1
City: Fairport / State: NY / Zip Code: 14450	Site Contact: Klaus Beyer	Lab Contact: Jane Fox	
Project Name and Location (State): Wilkeson Slip Buffalo, NY	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.: B000233100.0000			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: TCL VOC	TCL SVOC	TAL metals	TDML Cr	Free Cl	Special Instructions/ Conditions of Receipt
AW-02	8/22/12	1100		X			6		3		6		X	X	X	X	X	*MS/MSD
AW-01		1250					2			3	2		X	X	X	X	X	
DUP-082212		—					2			3	2		X	X	X	X	X	
TRIP BLANK	—	—								3			X					

Analysis (Attach list if more space is needed)

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)
Per contract

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☑ Other Standard

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	8/22/12	1530	1. Received By		
2. Relinquished By			2. Received By	8/22/12	1530
3. Relinquished By			3. Received By		

Comments

3.0 #2

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-02**

Lab Sample ID: 480-24234-1
Client Matrix: Water

Date Sampled: 08/22/2012 1100
Date Received: 08/22/2012 1530

8260B Volatile Organic Compounds (GC/MS)

Analysis Method: 8260B
Prep Method: 5030B
Dilution: 1.0
Analysis Date: 08/27/2012 1724
Prep Date: 08/27/2012 1724

Analysis Batch: 480-78272
Prep Batch: N/A

Instrument ID: HP5973Q
Lab File ID: Q2467.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		0.82	1.0
1,1,2,2-Tetrachloroethane	ND		0.21	1.0
1,1,2-Trichloroethane	ND		0.23	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.31	1.0
1,1-Dichloroethane	ND		0.38	1.0
1,1-Dichloroethene	ND		0.29	1.0
1,2,4-Trichlorobenzene	ND		0.41	1.0
1,2-Dibromo-3-Chloropropane	ND		0.39	1.0
1,2-Dibromoethane	ND		0.73	1.0
1,2-Dichlorobenzene	ND		0.79	1.0
1,2-Dichloroethane	ND		0.21	1.0
1,2-Dichloropropane	ND		0.72	1.0
1,3-Dichlorobenzene	ND		0.78	1.0
1,4-Dichlorobenzene	ND		0.84	1.0
2-Hexanone	ND		1.2	5.0
2-Butanone (MEK)	ND		1.3	10
4-Methyl-2-pentanone (MIBK)	ND		2.1	5.0
Acetone	ND		3.0	10
Benzene	ND		0.41	1.0
Bromodichloromethane	ND		0.39	1.0
Bromoform	ND		0.26	1.0
Bromomethane	ND		0.69	1.0
Carbon disulfide	ND		0.19	1.0
Carbon tetrachloride	ND		0.27	1.0
Chlorobenzene	ND		0.75	1.0
Dibromochloromethane	ND		0.32	1.0
Chloroethane	ND		0.32	1.0
Chloroform	ND		0.34	1.0
Chloromethane	ND		0.35	1.0
cis-1,2-Dichloroethene	ND		0.81	1.0
cis-1,3-Dichloropropene	ND		0.36	1.0
Cyclohexane	ND		0.18	1.0
Dichlorodifluoromethane	ND		0.68	1.0
Ethylbenzene	ND		0.74	1.0
Isopropylbenzene	ND		0.79	1.0
Methyl acetate	ND		0.50	1.0
Methyl tert-butyl ether	ND		0.16	1.0
Methylcyclohexane	ND		0.16	1.0
Methylene Chloride	ND		0.44	1.0
Styrene	ND		0.73	1.0
Tetrachloroethene	ND		0.36	1.0
Toluene	ND		0.51	1.0
trans-1,2-Dichloroethene	ND		0.90	1.0
trans-1,3-Dichloropropene	ND		0.37	1.0
Trichloroethene	ND		0.46	1.0
Trichlorofluoromethane	ND		0.88	1.0

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-02**

Lab Sample ID: 480-24234-1
Client Matrix: Water

Date Sampled: 08/22/2012 1100
Date Received: 08/22/2012 1530

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-78272	Instrument ID:	HP5973Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q2467.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/27/2012 1724			Final Weight/Volume:	5 mL
Prep Date:	08/27/2012 1724				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		0.90	1.0
Xylenes, Total	ND		0.66	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	90		66 - 137
Toluene-d8 (Surr)	102		71 - 126
4-Bromofluorobenzene (Surr)	96		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-01**

Lab Sample ID: 480-24234-2
Client Matrix: Water

Date Sampled: 08/22/2012 1250
Date Received: 08/22/2012 1530

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-78272	Instrument ID:	HP5973Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q2470.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/27/2012 1848			Final Weight/Volume:	5 mL
Prep Date:	08/27/2012 1848				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		0.82	1.0
1,1,2,2-Tetrachloroethane	ND		0.21	1.0
1,1,2-Trichloroethane	ND		0.23	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.31	1.0
1,1-Dichloroethane	ND		0.38	1.0
1,1-Dichloroethene	ND		0.29	1.0
1,2,4-Trichlorobenzene	ND		0.41	1.0
1,2-Dibromo-3-Chloropropane	ND		0.39	1.0
1,2-Dibromoethane	ND		0.73	1.0
1,2-Dichlorobenzene	ND		0.79	1.0
1,2-Dichloroethane	ND		0.21	1.0
1,2-Dichloropropane	ND		0.72	1.0
1,3-Dichlorobenzene	ND		0.78	1.0
1,4-Dichlorobenzene	ND		0.84	1.0
2-Hexanone	ND		1.2	5.0
2-Butanone (MEK)	ND		1.3	10
4-Methyl-2-pentanone (MIBK)	ND		2.1	5.0
Acetone	ND		3.0	10
Benzene	0.58	J	0.41	1.0
Bromodichloromethane	ND		0.39	1.0
Bromoform	ND		0.26	1.0
Bromomethane	ND		0.69	1.0
Carbon disulfide	ND		0.19	1.0
Carbon tetrachloride	ND		0.27	1.0
Chlorobenzene	ND		0.75	1.0
Dibromochloromethane	ND		0.32	1.0
Chloroethane	ND		0.32	1.0
Chloroform	ND		0.34	1.0
Chloromethane	ND		0.35	1.0
cis-1,2-Dichloroethene	ND		0.81	1.0
cis-1,3-Dichloropropene	ND		0.36	1.0
Cyclohexane	ND		0.18	1.0
Dichlorodifluoromethane	ND		0.68	1.0
Ethylbenzene	ND		0.74	1.0
Isopropylbenzene	ND		0.79	1.0
Methyl acetate	ND		0.50	1.0
Methyl tert-butyl ether	ND		0.16	1.0
Methylcyclohexane	ND		0.16	1.0
Methylene Chloride	ND		0.44	1.0
Styrene	ND		0.73	1.0
Tetrachloroethene	ND		0.36	1.0
Toluene	ND		0.51	1.0
trans-1,2-Dichloroethene	ND		0.90	1.0
trans-1,3-Dichloropropene	ND		0.37	1.0
Trichloroethene	ND		0.46	1.0
Trichlorofluoromethane	ND		0.88	1.0

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-01**

Lab Sample ID: 480-24234-2
Client Matrix: Water

Date Sampled: 08/22/2012 1250
Date Received: 08/22/2012 1530

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-78272	Instrument ID:	HP5973Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q2470.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/27/2012 1848			Final Weight/Volume:	5 mL
Prep Date:	08/27/2012 1848				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		0.90	1.0
Xylenes, Total	ND		0.66	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	85		66 - 137
Toluene-d8 (Surr)	102		71 - 126
4-Bromofluorobenzene (Surr)	97		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **DUP-082212**

Lab Sample ID: 480-24234-3
Client Matrix: Water

Date Sampled: 08/22/2012 0000
Date Received: 08/22/2012 1530

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-78428	Instrument ID:	HP5973Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q2483.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/28/2012 1241			Final Weight/Volume:	5 mL
Prep Date:	08/28/2012 1241				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		0.82	1.0
1,1,2,2-Tetrachloroethane	ND		0.21	1.0
1,1,2-Trichloroethane	ND		0.23	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.31	1.0
1,1-Dichloroethane	ND		0.38	1.0
1,1-Dichloroethene	ND		0.29	1.0
1,2,4-Trichlorobenzene	ND		0.41	1.0
1,2-Dibromo-3-Chloropropane	ND		0.39	1.0
1,2-Dibromoethane	ND		0.73	1.0
1,2-Dichlorobenzene	ND		0.79	1.0
1,2-Dichloroethane	ND		0.21	1.0
1,2-Dichloropropane	ND		0.72	1.0
1,3-Dichlorobenzene	ND		0.78	1.0
1,4-Dichlorobenzene	ND		0.84	1.0
2-Hexanone	ND		1.2	5.0
2-Butanone (MEK)	ND		1.3	10
4-Methyl-2-pentanone (MIBK)	ND		2.1	5.0
Acetone	ND		3.0	10
Benzene	0.55	J	0.41	1.0
Bromodichloromethane	ND		0.39	1.0
Bromoform	ND		0.26	1.0
Bromomethane	ND	J	0.69	1.0
Carbon disulfide	ND		0.19	1.0
Carbon tetrachloride	ND		0.27	1.0
Chlorobenzene	ND		0.75	1.0
Dibromochloromethane	ND		0.32	1.0
Chloroethane	ND		0.32	1.0
Chloroform	ND		0.34	1.0
Chloromethane	ND		0.35	1.0
cis-1,2-Dichloroethene	ND		0.81	1.0
cis-1,3-Dichloropropene	ND		0.36	1.0
Cyclohexane	ND		0.18	1.0
Dichlorodifluoromethane	ND		0.68	1.0
Ethylbenzene	ND		0.74	1.0
Isopropylbenzene	ND		0.79	1.0
Methyl acetate	ND		0.50	1.0
Methyl tert-butyl ether	ND		0.16	1.0
Methylcyclohexane	ND		0.16	1.0
Methylene Chloride	ND		0.44	1.0
Styrene	ND		0.73	1.0
Tetrachloroethene	ND		0.36	1.0
Toluene	ND		0.51	1.0
trans-1,2-Dichloroethene	ND		0.90	1.0
trans-1,3-Dichloropropene	ND		0.37	1.0
Trichloroethene	ND		0.46	1.0
Trichlorofluoromethane	ND		0.88	1.0

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **DUP-082212**

Lab Sample ID: 480-24234-3
Client Matrix: Water

Date Sampled: 08/22/2012 0000
Date Received: 08/22/2012 1530

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-78428	Instrument ID:	HP5973Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q2483.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/28/2012 1241			Final Weight/Volume:	5 mL
Prep Date:	08/28/2012 1241				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		0.90	1.0
Xylenes, Total	ND		0.66	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	92		66 - 137
Toluene-d8 (Surr)	101		71 - 126
4-Bromofluorobenzene (Surr)	96		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **TRIP BLANK**

Lab Sample ID: 480-24234-4
Client Matrix: Water

Date Sampled: 08/22/2012 0000
Date Received: 08/22/2012 1530

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-78272	Instrument ID:	HP5973Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q2471.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/27/2012 1916			Final Weight/Volume:	5 mL
Prep Date:	08/27/2012 1916				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1-Trichloroethane	ND		0.82	1.0
1,1,2,2-Tetrachloroethane	ND		0.21	1.0
1,1,2-Trichloroethane	ND		0.23	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.31	1.0
1,1-Dichloroethane	ND		0.38	1.0
1,1-Dichloroethene	ND		0.29	1.0
1,2,4-Trichlorobenzene	ND		0.41	1.0
1,2-Dibromo-3-Chloropropane	ND		0.39	1.0
1,2-Dibromoethane	ND		0.73	1.0
1,2-Dichlorobenzene	ND		0.79	1.0
1,2-Dichloroethane	ND		0.21	1.0
1,2-Dichloropropane	ND		0.72	1.0
1,3-Dichlorobenzene	ND		0.78	1.0
1,4-Dichlorobenzene	ND		0.84	1.0
2-Hexanone	ND		1.2	5.0
2-Butanone (MEK)	ND		1.3	10
4-Methyl-2-pentanone (MIBK)	ND		2.1	5.0
Acetone	ND		3.0	10
Benzene	ND		0.41	1.0
Bromodichloromethane	ND		0.39	1.0
Bromoform	ND		0.26	1.0
Bromomethane	ND		0.69	1.0
Carbon disulfide	ND		0.19	1.0
Carbon tetrachloride	ND		0.27	1.0
Chlorobenzene	ND		0.75	1.0
Dibromochloromethane	ND		0.32	1.0
Chloroethane	ND		0.32	1.0
Chloroform	ND		0.34	1.0
Chloromethane	ND		0.35	1.0
cis-1,2-Dichloroethene	ND		0.81	1.0
cis-1,3-Dichloropropene	ND		0.36	1.0
Cyclohexane	ND		0.18	1.0
Dichlorodifluoromethane	ND		0.68	1.0
Ethylbenzene	ND		0.74	1.0
Isopropylbenzene	ND		0.79	1.0
Methyl acetate	ND		0.50	1.0
Methyl tert-butyl ether	ND		0.16	1.0
Methylcyclohexane	ND		0.16	1.0
Methylene Chloride	ND		0.44	1.0
Styrene	ND		0.73	1.0
Tetrachloroethene	ND		0.36	1.0
Toluene	ND		0.51	1.0
trans-1,2-Dichloroethene	ND		0.90	1.0
trans-1,3-Dichloropropene	ND		0.37	1.0
Trichloroethene	ND		0.46	1.0
Trichlorofluoromethane	ND		0.88	1.0

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **TRIP BLANK**

Lab Sample ID: 480-24234-4
Client Matrix: Water

Date Sampled: 08/22/2012 0000
Date Received: 08/22/2012 1530

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	480-78272	Instrument ID:	HP5973Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q2471.D
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	08/27/2012 1916			Final Weight/Volume:	5 mL
Prep Date:	08/27/2012 1916				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		0.90	1.0
Xylenes, Total	ND		0.66	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	89		66 - 137
Toluene-d8 (Surr)	100		71 - 126
4-Bromofluorobenzene (Surr)	98		73 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-02**

Lab Sample ID: 480-24234-1
Client Matrix: Water

Date Sampled: 08/22/2012 1100
Date Received: 08/22/2012 1530

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-78669	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-77914	Lab File ID:	X9595.D
Dilution:	1.0			Initial Weight/Volume:	1045 mL
Analysis Date:	08/30/2012 2201			Final Weight/Volume:	1 mL
Prep Date:	08/23/2012 1342			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Biphenyl	ND		0.62	4.8
bis (2-chloroisopropyl) ether	ND		0.50	4.8
2,4,5-Trichlorophenol	ND		0.46	4.8
2,4,6-Trichlorophenol	ND		0.58	4.8
2,4-Dichlorophenol	ND		0.49	4.8
2,4-Dimethylphenol	ND		0.48	4.8
2,4-Dinitrophenol	ND		2.1	9.6
2,4-Dinitrotoluene	ND		0.43	4.8
2,6-Dinitrotoluene	ND		0.38	4.8
2-Chloronaphthalene	ND		0.44	4.8
2-Chlorophenol	ND		0.51	4.8
2-Methylnaphthalene	ND		0.57	4.8
2-Methylphenol	ND		0.38	4.8
2-Nitroaniline	ND		0.40	9.6
2-Nitrophenol	ND		0.46	4.8
3,3'-Dichlorobenzidine	ND		0.38	4.8
3-Nitroaniline	ND		0.46	9.6
4,6-Dinitro-2-methylphenol	ND		2.1	9.6
4-Bromophenyl phenyl ether	ND		0.43	4.8
4-Chloro-3-methylphenol	ND		0.43	4.8
4-Chloroaniline	ND		0.56	4.8
4-Chlorophenyl phenyl ether	ND		0.33	4.8
4-Methylphenol	ND		0.34	9.6
4-Nitroaniline	ND		0.24	9.6
4-Nitrophenol	ND		1.5	9.6
Acenaphthene	1.1	J	0.39	4.8
Acenaphthylene	ND		0.36	4.8
Acetophenone	ND		0.52	4.8
Anthracene	ND		0.27	4.8
Atrazine	ND		0.44	4.8
Benzaldehyde	ND		0.26	4.8
Benzo(a)anthracene	ND		0.34	4.8
Benzo(a)pyrene	ND		0.45	4.8
Benzo(b)fluoranthene	ND		0.33	4.8
Benzo(g,h,i)perylene	ND		0.33	4.8
Benzo(k)fluoranthene	ND		0.70	4.8
Bis(2-chloroethoxy)methane	ND		0.33	4.8
Bis(2-chloroethyl)ether	ND		0.38	4.8
Bis(2-ethylhexyl) phthalate	ND		1.7	4.8
Butyl benzyl phthalate	ND		0.40	4.8
Caprolactam	ND		2.1	4.8
Carbazole	ND		0.29	4.8
Chrysene	ND		0.32	4.8
Di-n-butyl phthalate	ND		0.30	4.8
Di-n-octyl phthalate	ND		0.45	4.8
Dibenz(a,h)anthracene	ND		0.40	4.8

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-02**

Lab Sample ID: 480-24234-1
Client Matrix: Water

Date Sampled: 08/22/2012 1100
Date Received: 08/22/2012 1530

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-78669	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-77914	Lab File ID:	X9595.D
Dilution:	1.0			Initial Weight/Volume:	1045 mL
Analysis Date:	08/30/2012 2201			Final Weight/Volume:	1 mL
Prep Date:	08/23/2012 1342			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dibenzofuran	ND		0.49	9.6
Diethyl phthalate	ND		0.21	4.8
Dimethyl phthalate	ND		0.34	4.8
Fluoranthene	ND		0.38	4.8
Fluorene	ND		0.34	4.8
Hexachlorobenzene	ND		0.49	4.8
Hexachlorobutadiene	ND		0.65	4.8
Hexachlorocyclopentadiene	ND		0.56	4.8
Hexachloroethane	ND		0.56	4.8
Indeno(1,2,3-cd)pyrene	ND		0.45	4.8
Isophorone	ND		0.41	4.8
N-Nitrosodi-n-propylamine	ND		0.52	4.8
N-Nitrosodiphenylamine	ND		0.49	4.8
Naphthalene	1.4	J	0.73	4.8
Nitrobenzene	ND		0.28	4.8
Pentachlorophenol	ND		2.1	9.6
Phenanthrene	ND		0.42	4.8
Phenol	ND		0.37	4.8
Pyrene	0.59	J	0.33	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	106		52 - 132
2-Fluorobiphenyl	74		48 - 120
2-Fluorophenol	43		20 - 120
Nitrobenzene-d5	77		46 - 120
p-Terphenyl-d14	35	X	67 - 150
Phenol-d5	33		16 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-01**

Lab Sample ID: 480-24234-2
Client Matrix: Water

Date Sampled: 08/22/2012 1250
Date Received: 08/22/2012 1530

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-78669	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-77914	Lab File ID:	X9596.D
Dilution:	1.0			Initial Weight/Volume:	1060 mL
Analysis Date:	08/30/2012 2225			Final Weight/Volume:	1 mL
Prep Date:	08/23/2012 1342			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Biphenyl	ND		0.62	4.7
bis (2-chloroisopropyl) ether	ND		0.49	4.7
2,4,5-Trichlorophenol	ND		0.45	4.7
2,4,6-Trichlorophenol	ND		0.58	4.7
2,4-Dichlorophenol	ND		0.48	4.7
2,4-Dimethylphenol	ND		0.47	4.7
2,4-Dinitrophenol	ND		2.1	9.4
2,4-Dinitrotoluene	ND		0.42	4.7
2,6-Dinitrotoluene	ND		0.38	4.7
2-Chloronaphthalene	ND		0.43	4.7
2-Chlorophenol	ND		0.50	4.7
2-Methylnaphthalene	ND		0.57	4.7
2-Methylphenol	ND		0.38	4.7
2-Nitroaniline	ND		0.40	9.4
2-Nitrophenol	ND		0.45	4.7
3,3'-Dichlorobenzidine	ND		0.38	4.7
3-Nitroaniline	ND		0.45	9.4
4,6-Dinitro-2-methylphenol	ND		2.1	9.4
4-Bromophenyl phenyl ether	ND		0.42	4.7
4-Chloro-3-methylphenol	ND		0.42	4.7
4-Chloroaniline	ND		0.56	4.7
4-Chlorophenyl phenyl ether	ND		0.33	4.7
4-Methylphenol	ND		0.34	9.4
4-Nitroaniline	ND		0.24	9.4
4-Nitrophenol	ND		1.4	9.4
Acenaphthene	2.2	J	0.39	4.7
Acenaphthylene	ND		0.36	4.7
Acetophenone	ND		0.51	4.7
Anthracene	ND		0.26	4.7
Atrazine	ND		0.43	4.7
Benzaldehyde	ND		0.25	4.7
Benzo(a)anthracene	ND		0.34	4.7
Benzo(a)pyrene	ND		0.44	4.7
Benzo(b)fluoranthene	ND		0.32	4.7
Benzo(g,h,i)perylene	ND		0.33	4.7
Benzo(k)fluoranthene	ND		0.69	4.7
Bis(2-chloroethoxy)methane	ND		0.33	4.7
Bis(2-chloroethyl)ether	ND		0.38	4.7
Bis(2-ethylhexyl) phthalate	ND		1.7	4.7
Butyl benzyl phthalate	ND		0.40	4.7
Caprolactam	ND		2.1	4.7
Carbazole	ND		0.28	4.7
Chrysene	ND		0.31	4.7
Di-n-butyl phthalate	ND		0.29	4.7
Di-n-octyl phthalate	1.9	J	0.44	4.7
Dibenz(a,h)anthracene	ND		0.40	4.7

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-01**

Lab Sample ID: 480-24234-2
Client Matrix: Water

Date Sampled: 08/22/2012 1250
Date Received: 08/22/2012 1530

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-78669	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-77914	Lab File ID:	X9596.D
Dilution:	1.0			Initial Weight/Volume:	1060 mL
Analysis Date:	08/30/2012 2225			Final Weight/Volume:	1 mL
Prep Date:	08/23/2012 1342			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dibenzofuran	ND		0.48	9.4
Diethyl phthalate	ND		0.21	4.7
Dimethyl phthalate	ND		0.34	4.7
Fluoranthene	ND		0.38	4.7
Fluorene	ND		0.34	4.7
Hexachlorobenzene	ND		0.48	4.7
Hexachlorobutadiene	ND		0.64	4.7
Hexachlorocyclopentadiene	ND		0.56	4.7
Hexachloroethane	ND		0.56	4.7
Indeno(1,2,3-cd)pyrene	ND		0.44	4.7
Isophorone	ND		0.41	4.7
N-Nitrosodi-n-propylamine	ND		0.51	4.7
N-Nitrosodiphenylamine	ND		0.48	4.7
Naphthalene	ND		0.72	4.7
Nitrobenzene	ND		0.27	4.7
Pentachlorophenol	ND		2.1	9.4
Phenanthrene	ND		0.42	4.7
Phenol	ND		0.37	4.7
Pyrene	ND		0.32	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	106		52 - 132
2-Fluorobiphenyl	77		48 - 120
2-Fluorophenol	41		20 - 120
Nitrobenzene-d5	79		46 - 120
p-Terphenyl-d14	32	X	67 - 150
Phenol-d5	31		16 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **DUP-082212**

Lab Sample ID: 480-24234-3
Client Matrix: Water

Date Sampled: 08/22/2012 0000
Date Received: 08/22/2012 1530

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-78669	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-77914	Lab File ID:	X9597.D
Dilution:	1.0			Initial Weight/Volume:	1060 mL
Analysis Date:	08/30/2012 2249			Final Weight/Volume:	1 mL
Prep Date:	08/23/2012 1342			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Biphenyl	ND		0.62	4.7
bis (2-chloroisopropyl) ether	ND		0.49	4.7
2,4,5-Trichlorophenol	ND		0.45	4.7
2,4,6-Trichlorophenol	ND		0.58	4.7
2,4-Dichlorophenol	ND		0.48	4.7
2,4-Dimethylphenol	ND		0.47	4.7
2,4-Dinitrophenol	ND		2.1	9.4
2,4-Dinitrotoluene	ND		0.42	4.7
2,6-Dinitrotoluene	ND		0.38	4.7
2-Chloronaphthalene	ND		0.43	4.7
2-Chlorophenol	ND		0.50	4.7
2-Methylnaphthalene	ND		0.57	4.7
2-Methylphenol	ND		0.38	4.7
2-Nitroaniline	ND		0.40	9.4
2-Nitrophenol	ND		0.45	4.7
3,3'-Dichlorobenzidine	ND		0.38	4.7
3-Nitroaniline	ND		0.45	9.4
4,6-Dinitro-2-methylphenol	ND		2.1	9.4
4-Bromophenyl phenyl ether	ND		0.42	4.7
4-Chloro-3-methylphenol	ND		0.42	4.7
4-Chloroaniline	ND		0.56	4.7
4-Chlorophenyl phenyl ether	ND		0.33	4.7
4-Methylphenol	ND		0.34	9.4
4-Nitroaniline	ND		0.24	9.4
4-Nitrophenol	ND		1.4	9.4
Acenaphthene	2.0	J	0.39	4.7
Acenaphthylene	ND		0.36	4.7
Acetophenone	ND		0.51	4.7
Anthracene	ND		0.26	4.7
Atrazine	ND		0.43	4.7
Benzaldehyde	ND		0.25	4.7
Benzo(a)anthracene	ND		0.34	4.7
Benzo(a)pyrene	ND		0.44	4.7
Benzo(b)fluoranthene	ND		0.32	4.7
Benzo(g,h,i)perylene	ND		0.33	4.7
Benzo(k)fluoranthene	ND		0.69	4.7
Bis(2-chloroethoxy)methane	ND		0.33	4.7
Bis(2-chloroethyl)ether	ND		0.38	4.7
Bis(2-ethylhexyl) phthalate	ND		1.7	4.7
Butyl benzyl phthalate	ND		0.40	4.7
Caprolactam	ND		2.1	4.7
Carbazole	ND		0.28	4.7
Chrysene	ND		0.31	4.7
Di-n-butyl phthalate	ND		0.29	4.7
Di-n-octyl phthalate	ND		0.44	4.7
Dibenz(a,h)anthracene	ND		0.40	4.7

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **DUP-082212**

Lab Sample ID: 480-24234-3
Client Matrix: Water

Date Sampled: 08/22/2012 0000
Date Received: 08/22/2012 1530

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	480-78669	Instrument ID:	HP5973X
Prep Method:	3510C	Prep Batch:	480-77914	Lab File ID:	X9597.D
Dilution:	1.0			Initial Weight/Volume:	1060 mL
Analysis Date:	08/30/2012 2249			Final Weight/Volume:	1 mL
Prep Date:	08/23/2012 1342			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dibenzofuran	ND		0.48	9.4
Diethyl phthalate	ND		0.21	4.7
Dimethyl phthalate	ND		0.34	4.7
Fluoranthene	ND		0.38	4.7
Fluorene	ND		0.34	4.7
Hexachlorobenzene	ND		0.48	4.7
Hexachlorobutadiene	ND		0.64	4.7
Hexachlorocyclopentadiene	ND		0.56	4.7
Hexachloroethane	ND		0.56	4.7
Indeno(1,2,3-cd)pyrene	ND		0.44	4.7
Isophorone	ND		0.41	4.7
N-Nitrosodi-n-propylamine	ND		0.51	4.7
N-Nitrosodiphenylamine	ND		0.48	4.7
Naphthalene	ND		0.72	4.7
Nitrobenzene	ND		0.27	4.7
Pentachlorophenol	ND		2.1	9.4
Phenanthrene	ND		0.42	4.7
Phenol	ND		0.37	4.7
Pyrene	ND		0.32	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	94		52 - 132
2-Fluorobiphenyl	71		48 - 120
2-Fluorophenol	38		20 - 120
Nitrobenzene-d5	71		46 - 120
p-Terphenyl-d14	51	X	67 - 150
Phenol-d5	27		16 - 120

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-02**

Lab Sample ID: 480-24234-1
Client Matrix: Water

Date Sampled: 08/22/2012 1100
Date Received: 08/22/2012 1530

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-78288	Instrument ID:	ICAP2
Prep Method:	3005A	Prep Batch:	480-77943	Lab File ID:	I2082412B-4.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/24/2012 1910			Final Weight/Volume:	50 mL
Prep Date:	08/24/2012 0820				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	0.30		0.060	0.20
Antimony	ND		0.0068	0.020
Arsenic	ND		0.0056	0.010
Barium	1.8		0.00070	0.0020
Beryllium	ND		0.00030	0.0020
Cadmium	ND		0.00050	0.0010
Calcium	376		0.10	0.50
Chromium	0.0019	J	0.0010	0.0040
Cobalt	0.0039	J	0.00063	0.0040
Copper	0.0031	J	0.0016	0.010
Iron	7.6		0.019	0.050
Lead	0.0095		0.0030	0.0050
Magnesium	68.2		0.043	0.20
Manganese	0.71		0.00040	0.0030
Nickel	ND		0.0013	0.010
Potassium	19.5		0.10	0.50
Selenium	ND		0.0087	0.015
Silver	ND		0.0017	0.0030
Thallium	ND		0.010	0.020
Vanadium	0.0042	J	0.0015	0.0050
Zinc	0.014		0.0015	0.010

Analysis Method:	6010B	Analysis Batch:	480-78555	Instrument ID:	ICAP2
Prep Method:	3005A	Prep Batch:	480-77943	Lab File ID:	I2082812A-6.asc
Dilution:	5.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/28/2012 1928			Final Weight/Volume:	50 mL
Prep Date:	08/24/2012 0820				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Sodium	8090		1.6	5.0

7470A Mercury (CVAA)

Analysis Method:	7470A	Analysis Batch:	480-77925	Instrument ID:	LEEMAN2
Prep Method:	7470A	Prep Batch:	480-77832	Lab File ID:	H08232W1.PRN
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	08/23/2012 1248			Final Weight/Volume:	50 mL
Prep Date:	08/23/2012 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Mercury	ND		0.00012	0.00020

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **AW-01**

Lab Sample ID: 480-24234-2
Client Matrix: Water

Date Sampled: 08/22/2012 1250
Date Received: 08/22/2012 1530

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-78288	Instrument ID:	ICAP2
Prep Method:	3005A	Prep Batch:	480-77943	Lab File ID:	I2082412B-4.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/24/2012 1926			Final Weight/Volume:	50 mL
Prep Date:	08/24/2012 0820				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	0.071	J	0.060	0.20
Antimony	ND		0.0068	0.020
Arsenic	ND		0.0056	0.010
Barium	0.052		0.00070	0.0020
Beryllium	ND		0.00030	0.0020
Cadmium	ND		0.00050	0.0010
Calcium	294		0.10	0.50
Chromium	ND		0.0010	0.0040
Cobalt	ND		0.00063	0.0040
Copper	ND		0.0016	0.010
Iron	15.1		0.019	0.050
Lead	ND		0.0030	0.0050
Magnesium	19.6		0.043	0.20
Manganese	0.77		0.00040	0.0030
Nickel	ND		0.0013	0.010
Potassium	9.7		0.10	0.50
Selenium	ND		0.0087	0.015
Silver	ND		0.0017	0.0030
Sodium	498		0.32	1.0
Thallium	ND		0.010	0.020
Vanadium	0.0041	J	0.0015	0.0050
Zinc	0.0034	J	0.0015	0.010

7470A Mercury (CVAA)

Analysis Method:	7470A	Analysis Batch:	480-77925	Instrument ID:	LEEMAN2
Prep Method:	7470A	Prep Batch:	480-77832	Lab File ID:	H08232W1.PRN
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	08/23/2012 1402			Final Weight/Volume:	50 mL
Prep Date:	08/23/2012 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Mercury	ND		0.00012	0.00020

Client: ARCADIS U.S. Inc

Job Number: 480-24234-1

Client Sample ID: **DUP-082212**

Lab Sample ID: 480-24234-3
Client Matrix: Water

Date Sampled: 08/22/2012 0000
Date Received: 08/22/2012 1530

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	480-78288	Instrument ID:	ICAP2
Prep Method:	3005A	Prep Batch:	480-77943	Lab File ID:	I2082412B-4.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/24/2012 1929			Final Weight/Volume:	50 mL
Prep Date:	08/24/2012 0820				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	0.086	J	0.060	0.20
Antimony	ND		0.0068	0.020
Arsenic	ND		0.0056	0.010
Barium	0.052		0.00070	0.0020
Beryllium	ND		0.00030	0.0020
Cadmium	0.00053	J	0.00050	0.0010
Calcium	301		0.10	0.50
Chromium	ND		0.0010	0.0040
Cobalt	0.00071	J	0.00063	0.0040
Copper	0.0022	J	0.0016	0.010
Iron	15.3		0.019	0.050
Lead	ND		0.0030	0.0050
Magnesium	19.7		0.043	0.20
Manganese	0.78		0.00040	0.0030
Nickel	ND		0.0013	0.010
Potassium	9.7		0.10	0.50
Selenium	ND		0.0087	0.015
Silver	ND		0.0017	0.0030
Sodium	504		0.32	1.0
Thallium	ND		0.010	0.020
Vanadium	0.0047	J	0.0015	0.0050
Zinc	0.0026	J	0.0015	0.010

7470A Mercury (CVAA)

Analysis Method:	7470A	Analysis Batch:	480-77925	Instrument ID:	LEEMAN2
Prep Method:	7470A	Prep Batch:	480-77832	Lab File ID:	H08232W1.PRN
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	08/23/2012 1258			Final Weight/Volume:	50 mL
Prep Date:	08/23/2012 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Mercury	ND		0.00012	0.00020

General Chemistry

Client Sample ID: AW-02

Lab Sample ID: 480-24234-1
Client Matrix: Water

Date Sampled: 08/22/2012 1100
Date Received: 08/22/2012 1530

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	0.020 ~~0.012~~	UBJ-JB	mg/L	0.0050	0.020	1.0	9012A
	Analysis Batch: 480-78679		Analysis Date: 08/29/2012 1555				
	Prep Batch: 480-78480		Prep Date: 08/28/2012 1115				
Cyanide, Free	ND		ug/L	0.54	2.0	1.0	9016
	Analysis Batch: 460-125820		Analysis Date: 08/27/2012 1500				
	Prep Batch: 460-125818		Prep Date: 08/27/2012 0900				

General Chemistry

Client Sample ID: AW-01

Lab Sample ID: 480-24234-2
Client Matrix: Water

Date Sampled: 08/22/2012 1250
Date Received: 08/22/2012 1530

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	0.088	J B	mg/L	0.0050	0.020	1.0	9012A
Analysis Batch: 480-78679	Analysis Date: 08/29/2012 1558						
Prep Batch: 480-78480	Prep Date: 08/28/2012 1115						
Cyanide, Free	2.0 ~~0.98~~	UB ~~J B~~	ug/L	0.54	2.0	1.0	9016
Analysis Batch: 460-125820	Analysis Date: 08/27/2012 1500						
Prep Batch: 460-125818	Prep Date: 08/27/2012 0900						

General Chemistry

Client Sample ID: **DUP-082212**

Lab Sample ID: 480-24234-3
Client Matrix: Water

Date Sampled: 08/22/2012 0000
Date Received: 08/22/2012 1530

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	0.063	J B	mg/L	0.0050	0.020	1.0	9012A
Analysis Batch: 480-78679	Analysis Date: 08/29/2012 1559						
Prep Batch: 480-78480	Prep Date: 08/28/2012 1115						
Cyanide, Free	J.0 ~~1.3~~	U ~~J B~~	ug/L	0.54	2.0	1.0	9016
Analysis Batch: 460-125820	Analysis Date: 08/27/2012 1500						
Prep Batch: 460-125818	Prep Date: 08/27/2012 0900						

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Data Usability Summary Report (DUSR)

BUFFALO, NEW YORK

Volatile, Semivolatile, Metals, and Miscellaneous Analyses

SDG #480-44645-1

Analyses Performed By:
TestAmerica Laboratories
Buffalo, New York

Report #20226R
Review Level: Tier III
Project: B0023310.0000.00005

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #480-44645-1 for samples collected in association with the National Fuel Wilkenson Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	MISC
AW-01	480-44645-1	Water	8/27/2013		X	X		X	X
AW-02	480-44645-2	Water	8/27/2013		X	X		X	X
AW-03	480-44645-3	Water	8/27/2013		X	X		X	X
AW-04	480-44645-4	Water	8/27/2013		X	X		X	X
FD-01-082713	480-44645-5	Water	8/27/2013	AW-03	X	X		X	X
TRIP BLANK	480-44645-6	Water	8/27/2013		X				

Note:

1. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location AW-01.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 8260B and 8270C as referenced in NYSDEC-ASP. Data were reviewed in accordance with USEPA Region II SOP HW-24 - Validating Volatile Organic Compounds by SW-846 Method 8260B of October 2006 and New York State ASP 2005.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis	Cool to < 6°C; preserved to a pH of less than 2 s.u.
	Soil	48 hours from collection to extraction and 14 days from extraction to analysis	Cool to < 6°C.

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/ Continuing	Compound	Criteria
AW-01 AW-02 AW-03 AW-04 FD-01-082713 TRIP BLANK	CCV %D	1,2-Dibromo-3-Chloropropane	-29.0%
		Bromoform	-28.2%
		Carbon disulfide	-26.7%
		Cyclohexane	-22.3%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	
Initial Calibration	%RSD > 15% or a correlation coefficient <0.99	Non-detect	UJ
		Detect	J
	%RSD >90%	Non-detect	R
		Detect	J
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
AW-01	Bromodichloromethane	<LL but >10%	<LL but >10%
	Bromoform		
	Dibromochloromethane		
	Chloromethane		

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J

Control Limit	Sample Result	Qualification
< 10%	Non-detect	R
	Detect	J
Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample Locations	Compound
AW-01	Bromomethane
	Chloroethane

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 35% for water matrices and 75% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-03/ FD-01-082713	Benzene	4.8	4.9	AC

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks					X
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate(LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS)		X	X		
Matrix Spike Duplicate(MSD)		X	X		
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content					X
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X	X		
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
E. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

SEMIVOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to < 6°C
	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to < 6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the compounds listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (B) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
AW-03 AW-04	Acetophenone	Detected sample results <RL and <BAL	"UB" at the RL
AW-01 AW-02 AW-03	Phenanthrene		
AW-03	Bis(2-ethylhexyl)phthalate	Detected sample results >RL and <BAL	"UB" at detected sample concentration

RL Reporting limit

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.3 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.4 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
AW-01	3-Nitroaniline	<LL but >10%	<LL but >10%
	4-Chloroaniline	<LL but >10%	<LL but >10%
	4-Nitroaniline	<LL but >10%	AC
	Benzaldehyde	<LL but >10%	AC
	Benzo[g,h,i]perylene	AC	<LL but >10%
	Indeno[1,2,3-cd]pyrene	AC	<LL but >10%

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample Locations	Compound
AW-01	Benzaldehyde
	Benzo[g,h,i]perylene
	Dibenz(a,h)anthracene
	Indeno[1,2,3-cd]pyrene

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery
AW-01 AW-02 AW-03 AW-04 FD-01-082713	2,6-Dinitrotoluene	< LL but > 10%
	3-Nitroaniline	
	4-Bromophenyl phenyl ether	
	4-Chloroaniline	
	4-Nitroaniline	

The criteria used to evaluate the LCS recoveries are presented in the following table. In the case of an LCS deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 35% for water matrices and 75% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AW-03/ FD-01-082713	Acenaphthene	43	41	4.7 %
	Acenaphthylene	0.39 J	0.4 J	AC
	Anthracene	5.4	5	

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
	Benzaldehyde	0.44 J	0.41 J	
	Benzo[a]anthracene	0.35 J	0.36 J	
	Biphenyl	1.2 J	1.1 J	
	Carbazole	4.7	4.8	
	Dibenzofuran	17	16	
	Di-n-butyl phthalate	0.51 J	0.66 J	
	Fluoranthene	6.2	5.9	
	Fluorene	23	23	
	Pyrene	2.4 J	2.6 J	

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks					X
Laboratory Control Sample (LCS) %R		X	X		
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate(MSD) %R		X	X		
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content					X
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Quantitation transcriptions/calculations		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6000/7000 and 9012A/9016. Data were reviewed in accordance with USEPA National Functional Guidelines of July 2002.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

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METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010B	Water	180 days from collection to analysis	Cool to < 6°C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to < 6°C.
SW-846 7470	Water	28 days from collection to analysis	Cool to < 6°C preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool to < 6°C

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All analytes associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the analytes listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (B) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
AW-02 AW-03 AW-04 FD-01-082713	Zinc	Detected sample results <RL and <BAL	"UB" at the RL
AW-02	Iron	Detected sample results >RL and <BAL	"UB" at detected sample concentration

RL = reporting limit

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All CRDL standard recoveries were within control limits.

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS recovery control limits do not apply for MS performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD analysis exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 35% for water matrices and 75% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
AW-03/ FD-01-082713	Arsenic	0.0076 J	0.0056 U	AC
	Barium	0.063	0.063	0.0 %
	Calcium	245	243	0.8 %
	Chromium	0.0021 J	0.0022 J	AC
	Copper	0.0016 U	0.0017 J	AC
	Iron	16.3	16.1	1.2 %
	Magnesium	13.8	13.6	1.4 %
	Manganese	0.76	0.75	1.3 %
	Potassium	10.1	10	0.9 %
	Sodium	341	337	1.1 %
	Vanadium	0.0029 J	0.0028 J	AC

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated

with the same sample analyzed with a five-fold dilution.

The serial dilution exhibited %D within the control limit.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6000/7000	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP) Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X	X		
C. Equipment/Field Blanks					X
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution		X		X	
Reporting Limit Verification		X		X	
Raw Data		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard		X		X	
ICP Interference Check		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%R Percent recovery
RPD Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Cyanide by SW-846 9012/9016	Water	14 days from collection to analysis	Cool to < 6°C; preserved to a pH of greater than 12.
	Soil		Cool to < 6°C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all initial calibration verification standard recoveries were within control limits.

All calibration standard recoveries were within the control limit.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.3 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the

analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD analysis exhibited recoveries within the control limits.

4.4 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 35% for water matrices and 75% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
AW-03/ FD-01-082713	Cyanide, Total	0.11	0.1	9.5%

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SW-846 9012/9016	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
F. Method blanks		X		X	
G. Equipment blanks					X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Moisture Content					X
Tier III Validation					
Initial calibration %RSD or correlation coefficient		X		X	
Continuing calibration %R		X		X	
Raw Data					
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference

SAMPLE COMPLIANCE REPORT

Sample Delivery Group (SDG)	Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
					VOC	SVOC	PCB	MET	MISC	
480-44645	8/27/2013	SW846	AW-01	Water	No	No	--	Yes	Yes	VOC - CCAL %D SVOC – Blank contamination, LCS %R, MS/MSD %R, MS/MSD RPD
	8/27/2013	SW846	AW-02	Water	No	No	--	No	Yes	VOC - CCAL %D SVOC – Blank contamination, LCS %R Metals – Blank contamination
	8/27/2013	SW846	AW-03	Water	No	No	--	No	Yes	VOC - CCAL %D SVOC – Blank contamination, LCS %R Metals – Blank contamination
	8/27/2013	SW846	AW-04	Water	No	No	--	No	Yes	VOC - CCAL %D SVOC – Blank contamination, LCS %R Metals – Blank contamination
	8/27/2013	SW846	FD-01-082713	Water	No	Yes	--	No	Yes	VOC - CCAL %D SVOC – LCS %R Metals – Blank contamination
	8/27/2013	SW846	TRIP BLANK	Water	No	--	--	--	--	VOC - CCAL %D

1 Samples which are compliant with no added validation qualifiers are listed as "yes". Samples which are non-compliant or which have added qualifiers are listed as "no". A "no" designation does not necessarily indicate that the data have been rejected or are otherwise unusable.

VALIDATION PERFORMED BY: Todd Church

SIGNATURE: 

DATE: September 20, 2013

PEER REVIEW: Dennis Capria

DATE: October 2, 2013

CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information
Client Contact: Jeff Brayer
Company: ARCADIS U.S. Inc
Address: 50 Fountain Plaza Suite 600
City: Buffalo
State, Zip: NY, 14202
Phone:
Email: Jeff.Brayer@arcadis-us.com
Project Name: National Fuel - 4th Street Buffalo
Site:

Sampler:
Phone:
Lab PM: Deyo, Melissa L
E-Mail: melissa.deyo@testamericainc.com
Carrier Tracking No(s):
COC No: 480-38902-10268.1
Page: Page 1 of 1
Job #:
Due Date Requested:
TAT Requested (days): 10 Days
PO #: B0023310.0001.00002
WO #:
Project #: 48007113
SSOW#:

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - TCL Volatiles	8270C - TCL Semivolatiles	6010B, 7470A	9012A - Cyanide, Total	Total Number of containers	Special Instructions
			Preservation Code:				A	N	D	B		
AW-01	08/27/13	13:40	G	Water	N		3	2	1	1	7	
AW-02		11:35		Water			3	2	1	1	7	
AW-03		15:25		Water			3	2	1	1	7	
AW-04		16:40		Water			3	2	1	1	7	
AW-01 MS		13:40		Water		X	3	2	1	1	7	
AW-01 MSD		13:40		Water		X	3	2	1	1	7	
FD-01-082713		—		Water			3	2	1	1	7	
Trip Blank		—					1				1	
											50 Total	

480-44645 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)
Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: Dropped off

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Jeffrey Brayer	08/27/13 16:20	ARCADIS	Dropped off	8-27-13 18:20	TA Buffalo

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: 3.6 + CF #1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD exceeds the control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B7	Target analyte detected in method blank at or above method reporting limit. Concentration found in the sample was 10 times above the concentration found in the blank.
B	Compound was found in the blank and sample.
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample ID: AW-01
Date Collected: 08/27/13 13:40
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		4.0	3.3	ug/L			09/05/13 18:28	4
1,1,2,2-Tetrachloroethane	ND		4.0	0.84	ug/L			09/05/13 18:28	4
1,1,2-Trichloroethane	ND		4.0	0.92	ug/L			09/05/13 18:28	4
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		4.0	1.2	ug/L			09/05/13 18:28	4
1,1-Dichloroethane	ND		4.0	1.5	ug/L			09/05/13 18:28	4
1,1-Dichloroethene	ND		4.0	1.2	ug/L			09/05/13 18:28	4
1,2,4-Trichlorobenzene	ND		4.0	1.6	ug/L			09/05/13 18:28	4
1,2-Dibromo-3-Chloropropane	ND	UJ	4.0	1.6	ug/L			09/05/13 18:28	4
1,2-Dibromoethane	ND		4.0	2.9	ug/L			09/05/13 18:28	4
1,2-Dichlorobenzene	ND		4.0	3.2	ug/L			09/05/13 18:28	4
1,2-Dichloroethane	ND		4.0	0.84	ug/L			09/05/13 18:28	4
1,2-Dichloropropane	ND		4.0	2.9	ug/L			09/05/13 18:28	4
1,3-Dichlorobenzene	ND		4.0	3.1	ug/L			09/05/13 18:28	4
1,4-Dichlorobenzene	ND		4.0	3.4	ug/L			09/05/13 18:28	4
2-Hexanone	ND		20	5.0	ug/L			09/05/13 18:28	4
2-Butanone (MEK)	ND		40	5.3	ug/L			09/05/13 18:28	4
4-Methyl-2-pentanone (MIBK)	ND		20	8.4	ug/L			09/05/13 18:28	4
Acetone	ND		40	12	ug/L			09/05/13 18:28	4
Benzene	ND		4.0	1.6	ug/L			09/05/13 18:28	4
Bromodichloromethane	ND	UJ	4.0	1.6	ug/L			09/05/13 18:28	4
Bromoform	ND	UJ	4.0	1.0	ug/L			09/05/13 18:28	4
Bromomethane	ND	UJ	4.0	2.8	ug/L			09/05/13 18:28	4
Carbon disulfide	ND	UJ	4.0	0.76	ug/L			09/05/13 18:28	4
Carbon tetrachloride	ND		4.0	1.1	ug/L			09/05/13 18:28	4
Chlorobenzene	ND		4.0	3.0	ug/L			09/05/13 18:28	4
Dibromochloromethane	ND	UJ	4.0	1.3	ug/L			09/05/13 18:28	4
Chloroethane	ND	UJ	4.0	1.3	ug/L			09/05/13 18:28	4
Chloroform	ND		4.0	1.4	ug/L			09/05/13 18:28	4
Chloromethane	ND	UJ	4.0	1.4	ug/L			09/05/13 18:28	4
cis-1,2-Dichloroethene	ND		4.0	3.2	ug/L			09/05/13 18:28	4
cis-1,3-Dichloropropene	ND		4.0	1.4	ug/L			09/05/13 18:28	4
Cyclohexane	ND	UJ	4.0	0.72	ug/L			09/05/13 18:28	4
Dichlorodifluoromethane	ND		4.0	2.7	ug/L			09/05/13 18:28	4
Ethylbenzene	ND		4.0	3.0	ug/L			09/05/13 18:28	4
Isopropylbenzene	ND		4.0	3.2	ug/L			09/05/13 18:28	4
Methyl acetate	ND		4.0	2.0	ug/L			09/05/13 18:28	4
Methyl tert-butyl ether	ND		4.0	0.64	ug/L			09/05/13 18:28	4
Methylcyclohexane	ND		4.0	0.64	ug/L			09/05/13 18:28	4
Methylene Chloride	ND		4.0	1.8	ug/L			09/05/13 18:28	4
Styrene	ND		4.0	2.9	ug/L			09/05/13 18:28	4
Tetrachloroethene	ND		4.0	1.4	ug/L			09/05/13 18:28	4
Toluene	ND		4.0	2.0	ug/L			09/05/13 18:28	4
trans-1,2-Dichloroethene	ND		4.0	3.6	ug/L			09/05/13 18:28	4
trans-1,3-Dichloropropene	ND		4.0	1.5	ug/L			09/05/13 18:28	4
Trichloroethene	ND		4.0	1.8	ug/L			09/05/13 18:28	4
Trichlorofluoromethane	ND		4.0	3.5	ug/L			09/05/13 18:28	4
Vinyl chloride	ND		4.0	3.6	ug/L			09/05/13 18:28	4
Xylenes, Total	ND		8.0	2.6	ug/L			09/05/13 18:28	4

Client: ARCADIS U.S. Inc
Project/Site: National Fuel - 4th Street Buffalo

TestAmerica Job ID: 480-44645-1

Client Sample ID: AW-01
Date Collected: 08/27/13 13:40
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-1
Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	*99*		*66 - 137*		*09/05/13 18:28*	*4*
Toluene-d8 (Surr)	*110*		*71 - 126*		*09/05/13 18:28*	*4*
4-Bromofluorobenzene (Surr)	*108*		*73 - 120*		*09/05/13 18:28*	*4*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	ND		4.7	0.62	ug/L		08/28/13 14:50	08/30/13 08:53	1
bis (2-chloroisopropyl) ether	ND		4.7	0.49	ug/L		08/28/13 14:50	08/30/13 08:53	1
2,4,5-Trichlorophenol	ND		4.7	0.45	ug/L		08/28/13 14:50	08/30/13 08:53	1
2,4,6-Trichlorophenol	ND		4.7	0.58	ug/L		08/28/13 14:50	08/30/13 08:53	1
2,4-Dichlorophenol	ND		4.7	0.48	ug/L		08/28/13 14:50	08/30/13 08:53	1
2,4-Dimethylphenol	ND		4.7	0.47	ug/L		08/28/13 14:50	08/30/13 08:53	1
2,4-Dinitrophenol	ND		9.5	2.1	ug/L		08/28/13 14:50	08/30/13 08:53	1
2,4-Dinitrotoluene	ND		4.7	0.42	ug/L		08/28/13 14:50	08/30/13 08:53	1
2,6-Dinitrotoluene	ND	UJ	4.7	0.38	ug/L		08/28/13 14:50	08/30/13 08:53	1
2-Chloronaphthalene	ND		4.7	0.43	ug/L		08/28/13 14:50	08/30/13 08:53	1
2-Chlorophenol	ND		4.7	0.50	ug/L		08/28/13 14:50	08/30/13 08:53	1
2-Methylnaphthalene	ND		4.7	0.57	ug/L		08/28/13 14:50	08/30/13 08:53	1
2-Methylphenol	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 08:53	1
2-Nitroaniline	ND		9.5	0.40	ug/L		08/28/13 14:50	08/30/13 08:53	1
2-Nitrophenol	ND		4.7	0.45	ug/L		08/28/13 14:50	08/30/13 08:53	1
3,3'-Dichlorobenzidine	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 08:53	1
3-Nitroaniline	ND	UJ	9.5	0.45	ug/L		08/28/13 14:50	08/30/13 08:53	1
4,6-Dinitro-2-methylphenol	ND		9.5	2.1	ug/L		08/28/13 14:50	08/30/13 08:53	1
4-Bromophenyl phenyl ether	ND	UJ	4.7	0.43	ug/L		08/28/13 14:50	08/30/13 08:53	1
4-Chloro-3-methylphenol	ND		4.7	0.43	ug/L		08/28/13 14:50	08/30/13 08:53	1
4-Chloroaniline	ND	UJ	4.7	0.56	ug/L		08/28/13 14:50	08/30/13 08:53	1
4-Chlorophenyl phenyl ether	ND		4.7	0.33	ug/L		08/28/13 14:50	08/30/13 08:53	1
4-Methylphenol	ND		9.5	0.34	ug/L		08/28/13 14:50	08/30/13 08:53	1
4-Nitroaniline	ND	UJ	9.5	0.24	ug/L		08/28/13 14:50	08/30/13 08:53	1
4-Nitrophenol	ND		9.5	1.4	ug/L		08/28/13 14:50	08/30/13 08:53	1
Acenaphthene	**2.7**	**J**	4.7	0.39	ug/L		08/28/13 14:50	08/30/13 08:53	1
Acenaphthylene	ND		4.7	0.36	ug/L		08/28/13 14:50	08/30/13 08:53	1
Acetophenone	ND		4.7	0.51	ug/L		08/28/13 14:50	08/30/13 08:53	1
Anthracene	ND		4.7	0.26	ug/L		08/28/13 14:50	08/30/13 08:53	1
Atrazine	ND		4.7	0.43	ug/L		08/28/13 14:50	08/30/13 08:53	1
Benzaldehyde	**0.43**	**J**	4.7	0.25	ug/L		08/28/13 14:50	08/30/13 08:53	1
Benzo[a]anthracene	ND		4.7	0.34	ug/L		08/28/13 14:50	08/30/13 08:53	1
Benzo[a]pyrene	ND		4.7	0.44	ug/L		08/28/13 14:50	08/30/13 08:53	1
Benzo[b]fluoranthene	ND		4.7	0.32	ug/L		08/28/13 14:50	08/30/13 08:53	1
Benzo[g,h,i]perylene	ND	UJ	4.7	0.33	ug/L		08/28/13 14:50	08/30/13 08:53	1
Benzo[k]fluoranthene	ND		4.7	0.69	ug/L		08/28/13 14:50	08/30/13 08:53	1
Bis(2-chloroethoxy)methane	ND		4.7	0.33	ug/L		08/28/13 14:50	08/30/13 08:53	1
Bis(2-chloroethyl)ether	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 08:53	1
Bis(2-ethylhexyl) phthalate	ND		4.7	1.7	ug/L		08/28/13 14:50	08/30/13 08:53	1
Butyl benzyl phthalate	ND		4.7	0.40	ug/L		08/28/13 14:50	08/30/13 08:53	1
Caprolactam	ND		4.7	2.1	ug/L		08/28/13 14:50	08/30/13 08:53	1
Carbazole	ND		4.7	0.28	ug/L		08/28/13 14:50	08/30/13 08:53	1
Chrysene	ND		4.7	0.31	ug/L		08/28/13 14:50	08/30/13 08:53	1
Di-n-butyl phthalate	**0.40**	**J**	4.7	0.29	ug/L		08/28/13 14:50	08/30/13 08:53	1

Client Sample ID: AW-01
Date Collected: 08/27/13 13:40
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-1
Matrix: Water

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Di-n-octyl phthalate	ND		4.7	0.44	ug/L		08/28/13 14:50	08/30/13 08:53	1
Dibenz(a,h)anthracene	ND	UJ	4.7	0.40	ug/L		08/28/13 14:50	08/30/13 08:53	1
Dibenzofuran	ND		9.5	0.48	ug/L		08/28/13 14:50	08/30/13 08:53	1
Diethyl phthalate	ND		4.7	0.21	ug/L		08/28/13 14:50	08/30/13 08:53	1
Dimethyl phthalate	ND		4.7	0.34	ug/L		08/28/13 14:50	08/30/13 08:53	1
Fluoranthene	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 08:53	1
Fluorene	ND		4.7	0.34	ug/L		08/28/13 14:50	08/30/13 08:53	1
Hexachlorobenzene	ND		4.7	0.48	ug/L		08/28/13 14:50	08/30/13 08:53	1
Hexachlorobutadiene	ND		4.7	0.64	ug/L		08/28/13 14:50	08/30/13 08:53	1
Hexachlorocyclopentadiene	ND		4.7	0.56	ug/L		08/28/13 14:50	08/30/13 08:53	1
Hexachloroethane	ND		4.7	0.56	ug/L		08/28/13 14:50	08/30/13 08:53	1
Indeno[1,2,3-cd]pyrene	ND	UJ	4.7	0.44	ug/L		08/28/13 14:50	08/30/13 08:53	1
Isophorone	ND		4.7	0.41	ug/L		08/28/13 14:50	08/30/13 08:53	1
N-Nitrosodi-n-propylamine	ND		4.7	0.51	ug/L		08/28/13 14:50	08/30/13 08:53	1
N-Nitrosodiphenylamine	ND		4.7	0.48	ug/L		08/28/13 14:50	08/30/13 08:53	1
Naphthalene	ND		4.7	0.72	ug/L		08/28/13 14:50	08/30/13 08:53	1
Nitrobenzene	ND		4.7	0.27	ug/L		08/28/13 14:50	08/30/13 08:53	1
Pentachlorophenol	ND		9.5	2.1	ug/L		08/28/13 14:50	08/30/13 08:53	1
Phenanthrene	4.7	~~0.43 J B~~ UB	4.7	0.42	ug/L		08/28/13 14:50	08/30/13 08:53	1
Phenol	ND		4.7	0.37	ug/L		08/28/13 14:50	08/30/13 08:53	1
Pyrene	ND		4.7	0.32	ug/L		08/28/13 14:50	08/30/13 08:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol	*99*		*39 - 146*	*08/28/13 14:50*	*08/30/13 08:53*	*1*
2-Fluorobiphenyl	*91*		*37 - 120*	*08/28/13 14:50*	*08/30/13 08:53*	*1*
2-Fluorophenol	*69*		*18 - 120*	*08/28/13 14:50*	*08/30/13 08:53*	*1*
Nitrobenzene-d5	*93*		*34 - 132*	*08/28/13 14:50*	*08/30/13 08:53*	*1*
p-Terphenyl-d14	*98*		*58 - 147*	*08/28/13 14:50*	*08/30/13 08:53*	*1*
Phenol-d5	*46*		*11 - 120*	*08/28/13 14:50*	*08/30/13 08:53*	*1*

Method: 6010B - Inductively Coupled Plasma - Atomic Emission Spectrometry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20	0.060	mg/L		08/28/13 08:40	08/28/13 18:09	1
Antimony	ND		0.020	0.0068	mg/L		08/28/13 08:40	08/28/13 18:09	1
Arsenic	ND		0.010	0.0056	mg/L		08/28/13 08:40	08/28/13 18:09	1
Barium	0.051		0.0020	0.00070	mg/L		08/28/13 08:40	08/28/13 18:09	1
Beryllium	ND		0.0020	0.00030	mg/L		08/28/13 08:40	08/28/13 18:09	1
Cadmium	ND		0.0010	0.00050	mg/L		08/28/13 08:40	08/28/13 18:09	1
Calcium	344		0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:09	1
Chromium	0.0018	J	0.0040	0.0010	mg/L		08/28/13 08:40	08/28/13 18:09	1
Cobalt	0.00071	J	0.0040	0.00063	mg/L		08/28/13 08:40	08/28/13 18:09	1
Copper	0.0020	J	0.010	0.0016	mg/L		08/28/13 08:40	08/28/13 18:09	1
Iron	11.9	~~B7~~	0.050	0.019	mg/L		08/28/13 08:40	08/28/13 18:09	1
Lead	ND		0.0050	0.0030	mg/L		08/28/13 08:40	08/28/13 18:09	1
Magnesium	19.9		0.20	0.043	mg/L		08/28/13 08:40	08/28/13 18:09	1
Manganese	0.80	~~B~~	0.0030	0.00040	mg/L		08/28/13 08:40	08/28/13 18:09	1
Nickel	ND		0.010	0.0013	mg/L		08/28/13 08:40	08/28/13 18:09	1
Potassium	11.4	~~B~~	0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:09	1
Selenium	ND		0.015	0.0087	mg/L		08/28/13 08:40	08/28/13 18:09	1
Silver	ND		0.0030	0.0017	mg/L		08/28/13 08:40	08/28/13 18:09	1

Client Sample ID: AW-01

Lab Sample ID: 480-44645-1

Date Collected: 08/27/13 13:40

Matrix: Water

Date Received: 08/27/13 18:20

Method: 6010B - Inductively Coupled Plasma - Atomic Emission Spectrometry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	521		1.0	0.32	mg/L		08/28/13 08:40	08/28/13 18:09	1
Thallium	ND		0.020	0.010	mg/L		08/28/13 08:40	08/28/13 18:09	1
Vanadium	0.0025	J	0.0050	0.0015	mg/L		08/28/13 08:40	08/28/13 18:09	1
Zinc	ND		0.010	0.0015	mg/L		08/28/13 08:40	08/28/13 18:09	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		08/28/13 07:50	08/28/13 12:19	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	0.087		0.010	0.0050	mg/L		08/29/13 08:58	08/30/13 15:45	1

Client Sample ID: AW-02

Lab Sample ID: 480-44645-2

Date Collected: 08/27/13 11:35

Matrix: Water

Date Received: 08/27/13 18:20

Method: 8260B - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		4.0	3.3	ug/L			09/05/13 18:50	4
1,1,2,2-Tetrachloroethane	ND		4.0	0.84	ug/L			09/05/13 18:50	4
1,1,2-Trichloroethane	ND		4.0	0.92	ug/L			09/05/13 18:50	4
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		4.0	1.2	ug/L			09/05/13 18:50	4
1,1-Dichloroethane	ND		4.0	1.5	ug/L			09/05/13 18:50	4
1,1-Dichloroethene	ND		4.0	1.2	ug/L			09/05/13 18:50	4
1,2,4-Trichlorobenzene	ND		4.0	1.6	ug/L			09/05/13 18:50	4
1,2-Dibromo-3-Chloropropane	ND	UJ	4.0	1.6	ug/L			09/05/13 18:50	4
1,2-Dibromoethane	ND		4.0	2.9	ug/L			09/05/13 18:50	4
1,2-Dichlorobenzene	ND		4.0	3.2	ug/L			09/05/13 18:50	4
1,2-Dichloroethane	ND		4.0	0.84	ug/L			09/05/13 18:50	4
1,2-Dichloropropane	ND		4.0	2.9	ug/L			09/05/13 18:50	4
1,3-Dichlorobenzene	ND		4.0	3.1	ug/L			09/05/13 18:50	4
1,4-Dichlorobenzene	ND		4.0	3.4	ug/L			09/05/13 18:50	4
2-Hexanone	ND		20	5.0	ug/L			09/05/13 18:50	4
2-Butanone (MEK)	ND		40	5.3	ug/L			09/05/13 18:50	4
4-Methyl-2-pentanone (MIBK)	ND		20	8.4	ug/L			09/05/13 18:50	4
Acetone	ND		40	12	ug/L			09/05/13 18:50	4
Benzene	ND		4.0	1.6	ug/L			09/05/13 18:50	4
Bromodichloromethane	ND		4.0	1.6	ug/L			09/05/13 18:50	4
Bromoform	ND	UJ	4.0	1.0	ug/L			09/05/13 18:50	4
Bromomethane	ND		4.0	2.8	ug/L			09/05/13 18:50	4
Carbon disulfide	ND	UJ	4.0	0.76	ug/L			09/05/13 18:50	4
Carbon tetrachloride	ND		4.0	1.1	ug/L			09/05/13 18:50	4
Chlorobenzene	ND		4.0	3.0	ug/L			09/05/13 18:50	4
Dibromochloromethane	ND		4.0	1.3	ug/L			09/05/13 18:50	4
Chloroethane	ND		4.0	1.3	ug/L			09/05/13 18:50	4
Chloroform	ND		4.0	1.4	ug/L			09/05/13 18:50	4
Chloromethane	ND		4.0	1.4	ug/L			09/05/13 18:50	4
cis-1,2-Dichloroethene	ND		4.0	3.2	ug/L			09/05/13 18:50	4
cis-1,3-Dichloropropene	ND		4.0	1.4	ug/L			09/05/13 18:50	4

Client: ARCADIS U.S. Inc
Project/Site: National Fuel - 4th Street Buffalo

TestAmerica Job ID: 480-44645-1

Client Sample ID: AW-02
Date Collected: 08/27/13 11:35
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyclohexane	ND	UJ	4.0	0.72	ug/L			09/05/13 18:50	4
Dichlorodifluoromethane	ND		4.0	2.7	ug/L			09/05/13 18:50	4
Ethylbenzene	ND		4.0	3.0	ug/L			09/05/13 18:50	4
Isopropylbenzene	ND		4.0	3.2	ug/L			09/05/13 18:50	4
Methyl acetate	ND		4.0	2.0	ug/L			09/05/13 18:50	4
Methyl tert-butyl ether	ND		4.0	0.64	ug/L			09/05/13 18:50	4
Methylcyclohexane	ND		4.0	0.64	ug/L			09/05/13 18:50	4
Methylene Chloride	ND		4.0	1.8	ug/L			09/05/13 18:50	4
Styrene	ND		4.0	2.9	ug/L			09/05/13 18:50	4
Tetrachloroethene	ND		4.0	1.4	ug/L			09/05/13 18:50	4
Toluene	ND		4.0	2.0	ug/L			09/05/13 18:50	4
trans-1,2-Dichloroethene	ND		4.0	3.6	ug/L			09/05/13 18:50	4
trans-1,3-Dichloropropene	ND		4.0	1.5	ug/L			09/05/13 18:50	4
Trichloroethene	ND		4.0	1.8	ug/L			09/05/13 18:50	4
Trichlorofluoromethane	ND		4.0	3.5	ug/L			09/05/13 18:50	4
Vinyl chloride	ND		4.0	3.6	ug/L			09/05/13 18:50	4
Xylenes, Total	ND		8.0	2.6	ug/L			09/05/13 18:50	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*66 - 137*		*09/05/13 18:50*	*4*
Toluene-d8 (Surr)	*111*		*71 - 126*		*09/05/13 18:50*	*4*
4-Bromofluorobenzene (Surr)	*108*		*73 - 120*		*09/05/13 18:50*	*4*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	ND		4.6	0.60	ug/L		08/28/13 14:50	08/30/13 09:21	1
bis (2-chloroisopropyl) ether	ND		4.6	0.48	ug/L		08/28/13 14:50	08/30/13 09:21	1
2,4,5-Trichlorophenol	ND		4.6	0.44	ug/L		08/28/13 14:50	08/30/13 09:21	1
2,4,6-Trichlorophenol	ND		4.6	0.57	ug/L		08/28/13 14:50	08/30/13 09:21	1
2,4-Dichlorophenol	ND		4.6	0.47	ug/L		08/28/13 14:50	08/30/13 09:21	1
2,4-Dimethylphenol	ND		4.6	0.46	ug/L		08/28/13 14:50	08/30/13 09:21	1
2,4-Dinitrophenol	ND		9.3	2.1	ug/L		08/28/13 14:50	08/30/13 09:21	1
2,4-Dinitrotoluene	ND		4.6	0.41	ug/L		08/28/13 14:50	08/30/13 09:21	1
2,6-Dinitrotoluene	ND	* UJ	4.6	0.37	ug/L		08/28/13 14:50	08/30/13 09:21	1
2-Chloronaphthalene	ND		4.6	0.43	ug/L		08/28/13 14:50	08/30/13 09:21	1
2-Chlorophenol	ND		4.6	0.49	ug/L		08/28/13 14:50	08/30/13 09:21	1
2-Methylnaphthalene	ND		4.6	0.56	ug/L		08/28/13 14:50	08/30/13 09:21	1
2-Methylphenol	ND		4.6	0.37	ug/L		08/28/13 14:50	08/30/13 09:21	1
2-Nitroaniline	ND		9.3	0.39	ug/L		08/28/13 14:50	08/30/13 09:21	1
2-Nitrophenol	ND		4.6	0.44	ug/L		08/28/13 14:50	08/30/13 09:21	1
3,3'-Dichlorobenzidine	ND		4.6	0.37	ug/L		08/28/13 14:50	08/30/13 09:21	1
3-Nitroaniline	ND	* UJ	9.3	0.44	ug/L		08/28/13 14:50	08/30/13 09:21	1
4,6-Dinitro-2-methylphenol	ND		9.3	2.0	ug/L		08/28/13 14:50	08/30/13 09:21	1
4-Bromophenyl phenyl ether	ND	* UJ	4.6	0.42	ug/L		08/28/13 14:50	08/30/13 09:21	1
4-Chloro-3-methylphenol	ND		4.6	0.42	ug/L		08/28/13 14:50	08/30/13 09:21	1
4-Chloroaniline	ND	* UJ	4.6	0.55	ug/L		08/28/13 14:50	08/30/13 09:21	1
4-Chlorophenyl phenyl ether	ND		4.6	0.32	ug/L		08/28/13 14:50	08/30/13 09:21	1
4-Methylphenol	ND		9.3	0.33	ug/L		08/28/13 14:50	08/30/13 09:21	1
4-Nitroaniline	ND	* UJ	9.3	0.23	ug/L		08/28/13 14:50	08/30/13 09:21	1
4-Nitrophenol	ND		9.3	1.4	ug/L		08/28/13 14:50	08/30/13 09:21	1

Client Sample ID: AW-02
Date Collected: 08/27/13 11:35
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-2
Matrix: Water

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**3.3**	**J**	4.6	0.38	ug/L		08/28/13 14:50	08/30/13 09:21	1
Acenaphthylene	ND		4.6	0.35	ug/L		08/28/13 14:50	08/30/13 09:21	1
Acetophenone	ND		4.6	0.50	ug/L		08/28/13 14:50	08/30/13 09:21	1
Anthracene	**0.32**	**J**	4.6	0.26	ug/L		08/28/13 14:50	08/30/13 09:21	1
Atrazine	ND		4.6	0.43	ug/L		08/28/13 14:50	08/30/13 09:21	1
Benzaldehyde	**0.31**	**J**	4.6	0.25	ug/L		08/28/13 14:50	08/30/13 09:21	1
Benzo[a]anthracene	ND		4.6	0.33	ug/L		08/28/13 14:50	08/30/13 09:21	1
Benzo[a]pyrene	ND		4.6	0.44	ug/L		08/28/13 14:50	08/30/13 09:21	1
Benzo[b]fluoranthene	ND		4.6	0.31	ug/L		08/28/13 14:50	08/30/13 09:21	1
Benzo[g,h,i]perylene	ND		4.6	0.32	ug/L		08/28/13 14:50	08/30/13 09:21	1
Benzo[k]fluoranthene	ND		4.6	0.68	ug/L		08/28/13 14:50	08/30/13 09:21	1
Bis(2-chloroethoxy)methane	ND		4.6	0.32	ug/L		08/28/13 14:50	08/30/13 09:21	1
Bis(2-chloroethyl)ether	ND		4.6	0.37	ug/L		08/28/13 14:50	08/30/13 09:21	1
Bis(2-ethylhexyl) phthalate	ND		4.6	1.7	ug/L		08/28/13 14:50	08/30/13 09:21	1
Butyl benzyl phthalate	ND		4.6	0.39	ug/L		08/28/13 14:50	08/30/13 09:21	1
Caprolactam	ND		4.6	2.0	ug/L		08/28/13 14:50	08/30/13 09:21	1
Carbazole	**0.71**	**J**	4.6	0.28	ug/L		08/28/13 14:50	08/30/13 09:21	1
Chrysene	ND		4.6	0.31	ug/L		08/28/13 14:50	08/30/13 09:21	1
Di-n-butyl phthalate	**0.48**	**J**	4.6	0.29	ug/L		08/28/13 14:50	08/30/13 09:21	1
Di-n-octyl phthalate	ND		4.6	0.44	ug/L		08/28/13 14:50	08/30/13 09:21	1
Dibenz(a,h)anthracene	ND		4.6	0.39	ug/L		08/28/13 14:50	08/30/13 09:21	1
Dibenzofuran	**0.79**	**J**	9.3	0.47	ug/L		08/28/13 14:50	08/30/13 09:21	1
Diethyl phthalate	ND		4.6	0.20	ug/L		08/28/13 14:50	08/30/13 09:21	1
Dimethyl phthalate	ND		4.6	0.33	ug/L		08/28/13 14:50	08/30/13 09:21	1
Fluoranthene	**1.6**	**J**	4.6	0.37	ug/L		08/28/13 14:50	08/30/13 09:21	1
Fluorene	**0.90**	**J**	4.6	0.33	ug/L		08/28/13 14:50	08/30/13 09:21	1
Hexachlorobenzene	ND		4.6	0.47	ug/L		08/28/13 14:50	08/30/13 09:21	1
Hexachlorobutadiene	ND		4.6	0.63	ug/L		08/28/13 14:50	08/30/13 09:21	1
Hexachlorocyclopentadiene	ND		4.6	0.55	ug/L		08/28/13 14:50	08/30/13 09:21	1
Hexachloroethane	ND		4.6	0.55	ug/L		08/28/13 14:50	08/30/13 09:21	1
Indeno[1,2,3-cd]pyrene	ND		4.6	0.44	ug/L		08/28/13 14:50	08/30/13 09:21	1
Isophorone	ND		4.6	0.40	ug/L		08/28/13 14:50	08/30/13 09:21	1
N-Nitrosodi-n-propylamine	ND		4.6	0.50	ug/L		08/28/13 14:50	08/30/13 09:21	1
N-Nitrosodiphenylamine	ND		4.6	0.47	ug/L		08/28/13 14:50	08/30/13 09:21	1
Naphthalene	ND		4.6	0.70	ug/L		08/28/13 14:50	08/30/13 09:21	1
Nitrobenzene	ND		4.6	0.27	ug/L		08/28/13 14:50	08/30/13 09:21	1
Pentachlorophenol	ND		9.3	2.0	ug/L		08/28/13 14:50	08/30/13 09:21	1
Phenanthrene 4.6	~~0.94~~ ~~J B~~	UB	4.6	0.41	ug/L		08/28/13 14:50	08/30/13 09:21	1
Phenol	ND		4.6	0.36	ug/L		08/28/13 14:50	08/30/13 09:21	1
Pyrene	**0.74**	**J**	4.6	0.31	ug/L		08/28/13 14:50	08/30/13 09:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol	*102*		*39 - 146*	*08/28/13 14:50*	*08/30/13 09:21*	*1*
2-Fluorobiphenyl	*94*		*37 - 120*	*08/28/13 14:50*	*08/30/13 09:21*	*1*
2-Fluorophenol	*72*		*18 - 120*	*08/28/13 14:50*	*08/30/13 09:21*	*1*
Nitrobenzene-d5	*97*		*34 - 132*	*08/28/13 14:50*	*08/30/13 09:21*	*1*
p-Terphenyl-d14	*104*		*58 - 147*	*08/28/13 14:50*	*08/30/13 09:21*	*1*
Phenol-d5	*48*		*11 - 120*	*08/28/13 14:50*	*08/30/13 09:21*	*1*

Client Sample ID: AW-02

Date Collected: 08/27/13 11:35
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-2
Matrix: Water

Method: 6010B - Inductively Coupled Plasma - Atomic Emission Spectrometry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.11	J	0.20	0.060	mg/L		08/28/13 08:40	08/28/13 18:28	1
Antimony	ND		0.020	0.0068	mg/L		08/28/13 08:40	08/28/13 18:28	1
Arsenic	ND		0.010	0.0056	mg/L		08/28/13 08:40	08/28/13 18:28	1
Barium	0.53		0.0020	0.00070	mg/L		08/28/13 08:40	08/28/13 18:28	1
Beryllium	ND		0.0020	0.00030	mg/L		08/28/13 08:40	08/28/13 18:28	1
Cadmium	ND		0.0010	0.00050	mg/L		08/28/13 08:40	08/28/13 18:28	1
Calcium	183		0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:28	1
Chromium	0.0015	J	0.0040	0.0010	mg/L		08/28/13 08:40	08/28/13 18:28	1
Cobalt	ND		0.0040	0.00063	mg/L		08/28/13 08:40	08/28/13 18:28	1
Copper	0.0020	J	0.010	0.0016	mg/L		08/28/13 08:40	08/28/13 18:28	1
Iron	0.32	UB	0.050	0.019	mg/L		08/30/13 09:10	08/30/13 23:41	1
Lead	ND		0.0050	0.0030	mg/L		08/28/13 08:40	08/28/13 18:28	1
Magnesium	32.0		0.20	0.043	mg/L		08/28/13 08:40	08/28/13 18:28	1
Manganese	0.38	B	0.0030	0.00040	mg/L		08/28/13 08:40	08/28/13 18:28	1
Nickel	ND		0.010	0.0013	mg/L		08/28/13 08:40	08/28/13 18:28	1
Potassium	16.3	B	0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:28	1
Selenium	ND		0.015	0.0087	mg/L		08/28/13 08:40	08/28/13 18:28	1
Silver	ND		0.0030	0.0017	mg/L		08/28/13 08:40	08/28/13 18:28	1
Sodium	764		1.0	0.32	mg/L		08/28/13 08:40	08/28/13 18:28	1
Thallium	ND		0.020	0.010	mg/L		08/28/13 08:40	08/28/13 18:28	1
Vanadium	ND		0.0050	0.0015	mg/L		08/28/13 08:40	08/28/13 18:28	1
Zinc	0.010 ~~0.0066~~	~~J B~~ UB	0.010	0.0015	mg/L		08/28/13 08:40	08/28/13 18:28	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		08/28/13 07:50	08/28/13 12:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.010	0.0050	mg/L		08/29/13 08:58	08/30/13 15:39	1

Client Sample ID: AW-03

Date Collected: 08/27/13 15:15
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		4.0	3.3	ug/L			09/05/13 19:11	4
1,1,2,2-Tetrachloroethane	ND		4.0	0.84	ug/L			09/05/13 19:11	4
1,1,2-Trichloroethane	ND		4.0	0.92	ug/L			09/05/13 19:11	4
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		4.0	1.2	ug/L			09/05/13 19:11	4
1,1-Dichloroethane	ND		4.0	1.5	ug/L			09/05/13 19:11	4
1,1-Dichloroethene	ND		4.0	1.2	ug/L			09/05/13 19:11	4
1,2,4-Trichlorobenzene	ND		4.0	1.6	ug/L			09/05/13 19:11	4
1,2-Dibromo-3-Chloropropane	ND	UJ	4.0	1.6	ug/L			09/05/13 19:11	4
1,2-Dibromoethane	ND		4.0	2.9	ug/L			09/05/13 19:11	4
1,2-Dichlorobenzene	ND		4.0	3.2	ug/L			09/05/13 19:11	4
1,2-Dichloroethane	ND		4.0	0.84	ug/L			09/05/13 19:11	4
1,2-Dichloropropane	ND		4.0	2.9	ug/L			09/05/13 19:11	4
1,3-Dichlorobenzene	ND		4.0	3.1	ug/L			09/05/13 19:11	4

Client: ARCADIS U.S. Inc
Project/Site: National Fuel - 4th Street Buffalo

TestAmerica Job ID: 480-44645-1

Client Sample ID: AW-03
Date Collected: 08/27/13 15:15
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		4.0	3.4	ug/L			09/05/13 19:11	4
2-Hexanone	ND		20	5.0	ug/L			09/05/13 19:11	4
2-Butanone (MEK)	ND		40	5.3	ug/L			09/05/13 19:11	4
4-Methyl-2-pentanone (MIBK)	ND		20	8.4	ug/L			09/05/13 19:11	4
Acetone	ND		40	12	ug/L			09/05/13 19:11	4
Benzene	**4.8**		4.0	1.6	ug/L			09/05/13 19:11	4
Bromodichloromethane	ND		4.0	1.6	ug/L			09/05/13 19:11	4
Bromoform	ND	UJ	4.0	1.0	ug/L			09/05/13 19:11	4
Bromomethane	ND		4.0	2.8	ug/L			09/05/13 19:11	4
Carbon disulfide	ND	UJ	4.0	0.76	ug/L			09/05/13 19:11	4
Carbon tetrachloride	ND		4.0	1.1	ug/L			09/05/13 19:11	4
Chlorobenzene	ND		4.0	3.0	ug/L			09/05/13 19:11	4
Dibromochloromethane	ND		4.0	1.3	ug/L			09/05/13 19:11	4
Chloroethane	ND		4.0	1.3	ug/L			09/05/13 19:11	4
Chloroform	ND		4.0	1.4	ug/L			09/05/13 19:11	4
Chloromethane	ND		4.0	1.4	ug/L			09/05/13 19:11	4
cis-1,2-Dichloroethene	ND		4.0	3.2	ug/L			09/05/13 19:11	4
cis-1,3-Dichloropropene	ND		4.0	1.4	ug/L			09/05/13 19:11	4
Cyclohexane	ND	UJ	4.0	0.72	ug/L			09/05/13 19:11	4
Dichlorodifluoromethane	ND		4.0	2.7	ug/L			09/05/13 19:11	4
Ethylbenzene	ND		4.0	3.0	ug/L			09/05/13 19:11	4
Isopropylbenzene	ND		4.0	3.2	ug/L			09/05/13 19:11	4
Methyl acetate	ND		4.0	2.0	ug/L			09/05/13 19:11	4
Methyl tert-butyl ether	ND		4.0	0.64	ug/L			09/05/13 19:11	4
Methylcyclohexane	ND		4.0	0.64	ug/L			09/05/13 19:11	4
Methylene Chloride	ND		4.0	1.8	ug/L			09/05/13 19:11	4
Styrene	ND		4.0	2.9	ug/L			09/05/13 19:11	4
Tetrachloroethene	ND		4.0	1.4	ug/L			09/05/13 19:11	4
Toluene	ND		4.0	2.0	ug/L			09/05/13 19:11	4
trans-1,2-Dichloroethene	ND		4.0	3.6	ug/L			09/05/13 19:11	4
trans-1,3-Dichloropropene	ND		4.0	1.5	ug/L			09/05/13 19:11	4
Trichloroethene	ND		4.0	1.8	ug/L			09/05/13 19:11	4
Trichlorofluoromethane	ND		4.0	3.5	ug/L			09/05/13 19:11	4
Vinyl chloride	ND		4.0	3.6	ug/L			09/05/13 19:11	4
Xylenes, Total	ND		8.0	2.6	ug/L			09/05/13 19:11	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*66 - 137*		*09/05/13 19:11*	*4*
Toluene-d8 (Surr)	*109*		*71 - 126*		*09/05/13 19:11*	*4*
4-Bromofluorobenzene (Surr)	*106*		*73 - 120*		*09/05/13 19:11*	*4*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	**1.2**	**J**	4.7	0.61	ug/L		08/28/13 14:50	08/30/13 09:49	1
bis (2-chloroisopropyl) ether	ND		4.7	0.49	ug/L		08/28/13 14:50	08/30/13 09:49	1
2,4,5-Trichlorophenol	ND		4.7	0.45	ug/L		08/28/13 14:50	08/30/13 09:49	1
2,4,6-Trichlorophenol	ND		4.7	0.57	ug/L		08/28/13 14:50	08/30/13 09:49	1
2,4-Dichlorophenol	ND		4.7	0.48	ug/L		08/28/13 14:50	08/30/13 09:49	1
2,4-Dimethylphenol	ND		4.7	0.47	ug/L		08/28/13 14:50	08/30/13 09:49	1
2,4-Dinitrophenol	ND		9.4	2.1	ug/L		08/28/13 14:50	08/30/13 09:49	1

Client: ARCADIS U.S. Inc
Project/Site: National Fuel - 4th Street Buffalo

TestAmerica Job ID: 480-44645-1

Client Sample ID: AW-03
Date Collected: 08/27/13 15:15
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-3
Matrix: Water

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-Dinitrotoluene	ND		4.7	0.42	ug/L		08/28/13 14:50	08/30/13 09:49	1
2,6-Dinitrotoluene	ND	UJ	4.7	0.38	ug/L		08/28/13 14:50	08/30/13 09:49	1
2-Chloronaphthalene	ND		4.7	0.43	ug/L		08/28/13 14:50	08/30/13 09:49	1
2-Chlorophenol	ND		4.7	0.50	ug/L		08/28/13 14:50	08/30/13 09:49	1
2-Methylnaphthalene	ND		4.7	0.56	ug/L		08/28/13 14:50	08/30/13 09:49	1
2-Methylphenol	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 09:49	1
2-Nitroaniline	ND		9.4	0.40	ug/L		08/28/13 14:50	08/30/13 09:49	1
2-Nitrophenol	ND		4.7	0.45	ug/L		08/28/13 14:50	08/30/13 09:49	1
3,3'-Dichlorobenzidine	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 09:49	1
3-Nitroaniline	ND	UJ	9.4	0.45	ug/L		08/28/13 14:50	08/30/13 09:49	1
4,6-Dinitro-2-methylphenol	ND		9.4	2.1	ug/L		08/28/13 14:50	08/30/13 09:49	1
4-Bromophenyl phenyl ether	ND	UJ	4.7	0.42	ug/L		08/28/13 14:50	08/30/13 09:49	1
4-Chloro-3-methylphenol	ND		4.7	0.42	ug/L		08/28/13 14:50	08/30/13 09:49	1
4-Chloroaniline	ND	UJ	4.7	0.55	ug/L		08/28/13 14:50	08/30/13 09:49	1
4-Chlorophenyl phenyl ether	ND		4.7	0.33	ug/L		08/28/13 14:50	08/30/13 09:49	1
4-Methylphenol	ND		9.4	0.34	ug/L		08/28/13 14:50	08/30/13 09:49	1
4-Nitroaniline	ND	UJ	9.4	0.24	ug/L		08/28/13 14:50	08/30/13 09:49	1
4-Nitrophenol	ND		9.4	1.4	ug/L		08/28/13 14:50	08/30/13 09:49	1
Acenaphthene	43		4.7	0.39	ug/L		08/28/13 14:50	08/30/13 09:49	1
Acenaphthylene	0.39	J	4.7	0.36	ug/L		08/28/13 14:50	08/30/13 09:49	1
Acetophenone	~~0.66~~	~~J B~~ UB	4.7	0.51	ug/L		08/28/13 14:50	08/30/13 09:49	1
Anthracene	5.4		4.7	0.26	ug/L		08/28/13 14:50	08/30/13 09:49	1
Atrazine	ND		4.7	0.43	ug/L		08/28/13 14:50	08/30/13 09:49	1
Benzaldehyde	0.44	J	4.7	0.25	ug/L		08/28/13 14:50	08/30/13 09:49	1
Benzo[a]anthracene	0.35	J	4.7	0.34	ug/L		08/28/13 14:50	08/30/13 09:49	1
Benzo[a]pyrene	ND		4.7	0.44	ug/L		08/28/13 14:50	08/30/13 09:49	1
Benzo[b]fluoranthene	ND		4.7	0.32	ug/L		08/28/13 14:50	08/30/13 09:49	1
Benzo[g,h,i]perylene	ND		4.7	0.33	ug/L		08/28/13 14:50	08/30/13 09:49	1
Benzo[k]fluoranthene	ND		4.7	0.69	ug/L		08/28/13 14:50	08/30/13 09:49	1
Bis(2-chloroethoxy)methane	ND		4.7	0.33	ug/L		08/28/13 14:50	08/30/13 09:49	1
Bis(2-chloroethyl)ether	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 09:49	1
Bis(2-ethylhexyl) phthalate	~~2.1~~	~~J B~~ UB	4.7	1.7	ug/L		08/28/13 14:50	08/30/13 09:49	1
Butyl benzyl phthalate	ND		4.7	0.40	ug/L		08/28/13 14:50	08/30/13 09:49	1
Caprolactam	ND		4.7	2.1	ug/L		08/28/13 14:50	08/30/13 09:49	1
Carbazole	4.7		4.7	0.28	ug/L		08/28/13 14:50	08/30/13 09:49	1
Chrysene	ND		4.7	0.31	ug/L		08/28/13 14:50	08/30/13 09:49	1
Di-n-butyl phthalate	0.51	J	4.7	0.29	ug/L		08/28/13 14:50	08/30/13 09:49	1
Di-n-octyl phthalate	ND		4.7	0.44	ug/L		08/28/13 14:50	08/30/13 09:49	1
Dibenz(a,h)anthracene	ND		4.7	0.40	ug/L		08/28/13 14:50	08/30/13 09:49	1
Dibenzofuran	17		9.4	0.48	ug/L		08/28/13 14:50	08/30/13 09:49	1
Diethyl phthalate	ND		4.7	0.21	ug/L		08/28/13 14:50	08/30/13 09:49	1
Dimethyl phthalate	ND		4.7	0.34	ug/L		08/28/13 14:50	08/30/13 09:49	1
Fluoranthene	6.2		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 09:49	1
Fluorene	23		4.7	0.34	ug/L		08/28/13 14:50	08/30/13 09:49	1
Hexachlorobenzene	ND		4.7	0.48	ug/L		08/28/13 14:50	08/30/13 09:49	1
Hexachlorobutadiene	ND		4.7	0.64	ug/L		08/28/13 14:50	08/30/13 09:49	1
Hexachlorocyclopentadiene	ND		4.7	0.55	ug/L		08/28/13 14:50	08/30/13 09:49	1
Hexachloroethane	ND		4.7	0.55	ug/L		08/28/13 14:50	08/30/13 09:49	1
Indeno[1,2,3-cd]pyrene	ND		4.7	0.44	ug/L		08/28/13 14:50	08/30/13 09:49	1

Client Sample ID: AW-03
Date Collected: 08/27/13 15:15
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-3
Matrix: Water

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Isophorone	ND		4.7	0.40	ug/L		08/28/13 14:50	08/30/13 09:49	1
N-Nitrosodi-n-propylamine	ND		4.7	0.51	ug/L		08/28/13 14:50	08/30/13 09:49	1
N-Nitrosodiphenylamine	ND		4.7	0.48	ug/L		08/28/13 14:50	08/30/13 09:49	1
Naphthalene	ND		4.7	0.71	ug/L		08/28/13 14:50	08/30/13 09:49	1
Nitrobenzene	ND		4.7	0.27	ug/L		08/28/13 14:50	08/30/13 09:49	1
Pentachlorophenol	ND		9.4	2.1	ug/L		08/28/13 14:50	08/30/13 09:49	1
Phenanthrene	**23**	**B**	4.7	0.41	ug/L		08/28/13 14:50	08/30/13 09:49	1
Phenol	ND		4.7	0.37	ug/L		08/28/13 14:50	08/30/13 09:49	1
Pyrene	**2.4**	**J**	4.7	0.32	ug/L		08/28/13 14:50	08/30/13 09:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol	*94*		*39 - 146*	*08/28/13 14:50*	*08/30/13 09:49*	*1*
2-Fluorobiphenyl	*85*		*37 - 120*	*08/28/13 14:50*	*08/30/13 09:49*	*1*
2-Fluorophenol	*66*		*18 - 120*	*08/28/13 14:50*	*08/30/13 09:49*	*1*
Nitrobenzene-d5	*88*		*34 - 132*	*08/28/13 14:50*	*08/30/13 09:49*	*1*
p-Terphenyl-d14	*96*		*58 - 147*	*08/28/13 14:50*	*08/30/13 09:49*	*1*
Phenol-d5	*43*		*11 - 120*	*08/28/13 14:50*	*08/30/13 09:49*	*1*

Method: 6010B - Inductively Coupled Plasma - Atomic Emission Spectrometry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20	0.060	mg/L		08/28/13 08:40	08/28/13 18:31	1
Antimony	ND		0.020	0.0068	mg/L		08/28/13 08:40	08/28/13 18:31	1
Arsenic	**0.0076**	**J**	0.010	0.0056	mg/L		08/28/13 08:40	08/28/13 18:31	1
Barium	**0.063**		0.0020	0.00070	mg/L		08/28/13 08:40	08/28/13 18:31	1
Beryllium	ND		0.0020	0.00030	mg/L		08/28/13 08:40	08/28/13 18:31	1
Cadmium	ND		0.0010	0.00050	mg/L		08/28/13 08:40	08/28/13 18:31	1
Calcium	**245**		0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:31	1
Chromium	**0.0021**	**J**	0.0040	0.0010	mg/L		08/28/13 08:40	08/28/13 18:31	1
Cobalt	ND		0.0040	0.00063	mg/L		08/28/13 08:40	08/28/13 18:31	1
Copper	ND		0.010	0.0016	mg/L		08/28/13 08:40	08/28/13 18:31	1
Iron	**16.3**	**B7**	0.050	0.019	mg/L		08/28/13 08:40	08/28/13 18:31	1
Lead	ND		0.0050	0.0030	mg/L		08/28/13 08:40	08/28/13 18:31	1
Magnesium	**13.8**		0.20	0.043	mg/L		08/28/13 08:40	08/28/13 18:31	1
Manganese	**0.76**	**B**	0.0030	0.00040	mg/L		08/28/13 08:40	08/28/13 18:31	1
Nickel	ND		0.010	0.0013	mg/L		08/28/13 08:40	08/28/13 18:31	1
Potassium	**10.1**	**B**	0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:31	1
Selenium	ND		0.015	0.0087	mg/L		08/28/13 08:40	08/28/13 18:31	1
Silver	ND		0.0030	0.0017	mg/L		08/28/13 08:40	08/28/13 18:31	1
Sodium	**341**		1.0	0.32	mg/L		08/28/13 08:40	08/28/13 18:31	1
Thallium	ND		0.020	0.010	mg/L		08/28/13 08:40	08/28/13 18:31	1
Vanadium	**0.0029**	**J**	0.0050	0.0015	mg/L		08/28/13 08:40	08/28/13 18:31	1
Zinc	0.010 **0.0027**	**J B** UB	0.010	0.0015	mg/L		08/28/13 08:40	08/28/13 18:31	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		08/28/13 07:50	08/28/13 12:31	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	**0.11**		0.010	0.0050	mg/L		08/29/13 08:58	08/30/13 15:40	1

Client: ARCADIS U.S. Inc
Project/Site: National Fuel - 4th Street Buffalo

TestAmerica Job ID: 480-44645-1

Client Sample ID: AW-04
Date Collected: 08/27/13 16:40
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		10	8.2	ug/L			09/05/13 19:32	10
1,1,2,2-Tetrachloroethane	ND		10	2.1	ug/L			09/05/13 19:32	10
1,1,2-Trichloroethane	ND		10	2.3	ug/L			09/05/13 19:32	10
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		10	3.1	ug/L			09/05/13 19:32	10
1,1-Dichloroethane	ND		10	3.8	ug/L			09/05/13 19:32	10
1,1-Dichloroethene	ND		10	2.9	ug/L			09/05/13 19:32	10
1,2,4-Trichlorobenzene	ND		10	4.1	ug/L			09/05/13 19:32	10
1,2-Dibromo-3-Chloropropane	ND	UJ	10	3.9	ug/L			09/05/13 19:32	10
1,2-Dibromoethane	ND		10	7.3	ug/L			09/05/13 19:32	10
1,2-Dichlorobenzene	ND		10	7.9	ug/L			09/05/13 19:32	10
1,2-Dichloroethane	ND		10	2.1	ug/L			09/05/13 19:32	10
1,2-Dichloropropane	ND		10	7.2	ug/L			09/05/13 19:32	10
1,3-Dichlorobenzene	ND		10	7.8	ug/L			09/05/13 19:32	10
1,4-Dichlorobenzene	ND		10	8.4	ug/L			09/05/13 19:32	10
2-Hexanone	ND		50	12	ug/L			09/05/13 19:32	10
2-Butanone (MEK)	ND		100	13	ug/L			09/05/13 19:32	10
4-Methyl-2-pentanone (MIBK)	ND		50	21	ug/L			09/05/13 19:32	10
Acetone	ND		100	30	ug/L			09/05/13 19:32	10
Benzene	**310**		10	4.1	ug/L			09/05/13 19:32	10
Bromodichloromethane	ND		10	3.9	ug/L			09/05/13 19:32	10
Bromoform	ND	UJ	10	2.6	ug/L			09/05/13 19:32	10
Bromomethane	ND		10	6.9	ug/L			09/05/13 19:32	10
Carbon disulfide	ND	UJ	10	1.9	ug/L			09/05/13 19:32	10
Carbon tetrachloride	ND		10	2.7	ug/L			09/05/13 19:32	10
Chlorobenzene	ND		10	7.5	ug/L			09/05/13 19:32	10
Dibromochloromethane	ND		10	3.2	ug/L			09/05/13 19:32	10
Chloroethane	ND		10	3.2	ug/L			09/05/13 19:32	10
Chloroform	ND		10	3.4	ug/L			09/05/13 19:32	10
Chloromethane	ND		10	3.5	ug/L			09/05/13 19:32	10
cis-1,2-Dichloroethene	ND		10	8.1	ug/L			09/05/13 19:32	10
cis-1,3-Dichloropropene	ND		10	3.6	ug/L			09/05/13 19:32	10
Cyclohexane	ND	UJ	10	1.8	ug/L			09/05/13 19:32	10
Dichlorodifluoromethane	ND		10	6.8	ug/L			09/05/13 19:32	10
Ethylbenzene	**36**		10	7.4	ug/L			09/05/13 19:32	10
Isopropylbenzene	ND		10	7.9	ug/L			09/05/13 19:32	10
Methyl acetate	ND		10	5.0	ug/L			09/05/13 19:32	10
Methyl tert-butyl ether	ND		10	1.6	ug/L			09/05/13 19:32	10
Methylcyclohexane	ND		10	1.6	ug/L			09/05/13 19:32	10
Methylene Chloride	ND		10	4.4	ug/L			09/05/13 19:32	10
Styrene	ND		10	7.3	ug/L			09/05/13 19:32	10
Tetrachloroethene	ND		10	3.6	ug/L			09/05/13 19:32	10
Toluene	ND		10	5.1	ug/L			09/05/13 19:32	10
trans-1,2-Dichloroethene	ND		10	9.0	ug/L			09/05/13 19:32	10
trans-1,3-Dichloropropene	ND		10	3.7	ug/L			09/05/13 19:32	10
Trichloroethene	ND		10	4.6	ug/L			09/05/13 19:32	10
Trichlorofluoromethane	ND		10	8.8	ug/L			09/05/13 19:32	10
Vinyl chloride	ND		10	9.0	ug/L			09/05/13 19:32	10
Xylenes, Total	**8.9**	**J**	20	6.6	ug/L			09/05/13 19:32	10

Client: ARCADIS U.S. Inc
Project/Site: National Fuel - 4th Street Buffalo

TestAmerica Job ID: 480-44645-1

Client Sample ID: AW-04
Date Collected: 08/27/13 16:40
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-4
Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	*98*		*66 - 137*		*09/05/13 19:32*	*10*
Toluene-d8 (Surr)	*109*		*71 - 126*		*09/05/13 19:32*	*10*
4-Bromofluorobenzene (Surr)	*107*		*73 - 120*		*09/05/13 19:32*	*10*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	ND		4.7	0.62	ug/L		08/28/13 14:50	08/30/13 10:17	1
bis (2-chloroisopropyl) ether	ND		4.7	0.49	ug/L		08/28/13 14:50	08/30/13 10:17	1
2,4,5-Trichlorophenol	ND		4.7	0.45	ug/L		08/28/13 14:50	08/30/13 10:17	1
2,4,6-Trichlorophenol	ND		4.7	0.58	ug/L		08/28/13 14:50	08/30/13 10:17	1
2,4-Dichlorophenol	ND		4.7	0.48	ug/L		08/28/13 14:50	08/30/13 10:17	1
2,4-Dimethylphenol	**14**		4.7	0.47	ug/L		08/28/13 14:50	08/30/13 10:17	1
2,4-Dinitrophenol	ND		9.4	2.1	ug/L		08/28/13 14:50	08/30/13 10:17	1
2,4-Dinitrotoluene	ND		4.7	0.42	ug/L		08/28/13 14:50	08/30/13 10:17	1
2,6-Dinitrotoluene	ND	UJ	4.7	0.38	ug/L		08/28/13 14:50	08/30/13 10:17	1
2-Chloronaphthalene	ND		4.7	0.43	ug/L		08/28/13 14:50	08/30/13 10:17	1
2-Chlorophenol	ND		4.7	0.50	ug/L		08/28/13 14:50	08/30/13 10:17	1
2-Methylnaphthalene	ND		4.7	0.57	ug/L		08/28/13 14:50	08/30/13 10:17	1
2-Methylphenol	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 10:17	1
2-Nitroaniline	ND		9.4	0.40	ug/L		08/28/13 14:50	08/30/13 10:17	1
2-Nitrophenol	ND		4.7	0.45	ug/L		08/28/13 14:50	08/30/13 10:17	1
3,3'-Dichlorobenzidine	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 10:17	1
3-Nitroaniline	ND	UJ	9.4	0.45	ug/L		08/28/13 14:50	08/30/13 10:17	1
4,6-Dinitro-2-methylphenol	ND		9.4	2.1	ug/L		08/28/13 14:50	08/30/13 10:17	1
4-Bromophenyl phenyl ether	ND	UJ	4.7	0.43	ug/L		08/28/13 14:50	08/30/13 10:17	1
4-Chloro-3-methylphenol	ND		4.7	0.43	ug/L		08/28/13 14:50	08/30/13 10:17	1
4-Chloroaniline	ND	UJ	4.7	0.56	ug/L		08/28/13 14:50	08/30/13 10:17	1
4-Chlorophenyl phenyl ether	ND		4.7	0.33	ug/L		08/28/13 14:50	08/30/13 10:17	1
4-Methylphenol	ND		9.4	0.34	ug/L		08/28/13 14:50	08/30/13 10:17	1
4-Nitroaniline	ND	UJ	9.4	0.24	ug/L		08/28/13 14:50	08/30/13 10:17	1
4-Nitrophenol	ND		9.4	1.4	ug/L		08/28/13 14:50	08/30/13 10:17	1
Acenaphthene	**1.8**	**J**	4.7	0.39	ug/L		08/28/13 14:50	08/30/13 10:17	1
Acenaphthylene	ND		4.7	0.36	ug/L		08/28/13 14:50	08/30/13 10:17	1
Acetophenone	~~0.71~~ 4.7	~~J B~~ UB	4.7	0.51	ug/L		08/28/13 14:50	08/30/13 10:17	1
Anthracene	ND		4.7	0.26	ug/L		08/28/13 14:50	08/30/13 10:17	1
Atrazine	ND		4.7	0.43	ug/L		08/28/13 14:50	08/30/13 10:17	1
Benzaldehyde	**0.42**	**J**	4.7	0.25	ug/L		08/28/13 14:50	08/30/13 10:17	1
Benzo[a]anthracene	ND		4.7	0.34	ug/L		08/28/13 14:50	08/30/13 10:17	1
Benzo[a]pyrene	ND		4.7	0.44	ug/L		08/28/13 14:50	08/30/13 10:17	1
Benzo[b]fluoranthene	ND		4.7	0.32	ug/L		08/28/13 14:50	08/30/13 10:17	1
Benzo[g,h,i]perylene	ND		4.7	0.33	ug/L		08/28/13 14:50	08/30/13 10:17	1
Benzo[k]fluoranthene	ND		4.7	0.69	ug/L		08/28/13 14:50	08/30/13 10:17	1
Bis(2-chloroethoxy)methane	ND		4.7	0.33	ug/L		08/28/13 14:50	08/30/13 10:17	1
Bis(2-chloroethyl)ether	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 10:17	1
Bis(2-ethylhexyl) phthalate	ND		4.7	1.7	ug/L		08/28/13 14:50	08/30/13 10:17	1
Butyl benzyl phthalate	ND		4.7	0.40	ug/L		08/28/13 14:50	08/30/13 10:17	1
Caprolactam	ND		4.7	2.1	ug/L		08/28/13 14:50	08/30/13 10:17	1
Carbazole	ND		4.7	0.28	ug/L		08/28/13 14:50	08/30/13 10:17	1
Chrysene	ND		4.7	0.31	ug/L		08/28/13 14:50	08/30/13 10:17	1
Di-n-butyl phthalate	**0.57**	**J**	4.7	0.29	ug/L		08/28/13 14:50	08/30/13 10:17	1

Client: ARCADIS U.S. Inc
Project/Site: National Fuel - 4th Street Buffalo

TestAmerica Job ID: 480-44645-1

Client Sample ID: AW-04
Date Collected: 08/27/13 16:40
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-4
Matrix: Water

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Di-n-octyl phthalate	ND		4.7	0.44	ug/L		08/28/13 14:50	08/30/13 10:17	1
Dibenz(a,h)anthracene	ND		4.7	0.40	ug/L		08/28/13 14:50	08/30/13 10:17	1
Dibenzofuran	ND		9.4	0.48	ug/L		08/28/13 14:50	08/30/13 10:17	1
Diethyl phthalate	ND		4.7	0.21	ug/L		08/28/13 14:50	08/30/13 10:17	1
Dimethyl phthalate	ND		4.7	0.34	ug/L		08/28/13 14:50	08/30/13 10:17	1
Fluoranthene	ND		4.7	0.38	ug/L		08/28/13 14:50	08/30/13 10:17	1
Fluorene	ND		4.7	0.34	ug/L		08/28/13 14:50	08/30/13 10:17	1
Hexachlorobenzene	ND		4.7	0.48	ug/L		08/28/13 14:50	08/30/13 10:17	1
Hexachlorobutadiene	ND		4.7	0.64	ug/L		08/28/13 14:50	08/30/13 10:17	1
Hexachlorocyclopentadiene	ND		4.7	0.56	ug/L		08/28/13 14:50	08/30/13 10:17	1
Hexachloroethane	ND		4.7	0.56	ug/L		08/28/13 14:50	08/30/13 10:17	1
Indeno[1,2,3-cd]pyrene	ND		4.7	0.44	ug/L		08/28/13 14:50	08/30/13 10:17	1
Isophorone	ND		4.7	0.41	ug/L		08/28/13 14:50	08/30/13 10:17	1
N-Nitrosodi-n-propylamine	ND		4.7	0.51	ug/L		08/28/13 14:50	08/30/13 10:17	1
N-Nitrosodiphenylamine	ND		4.7	0.48	ug/L		08/28/13 14:50	08/30/13 10:17	1
Naphthalene	**12**		4.7	0.72	ug/L		08/28/13 14:50	08/30/13 10:17	1
Nitrobenzene	ND		4.7	0.27	ug/L		08/28/13 14:50	08/30/13 10:17	1
Pentachlorophenol	ND		9.4	2.1	ug/L		08/28/13 14:50	08/30/13 10:17	1
Phenanthrene	ND		4.7	0.42	ug/L		08/28/13 14:50	08/30/13 10:17	1
Phenol	**4.1**	**J**	4.7	0.37	ug/L		08/28/13 14:50	08/30/13 10:17	1
Pyrene	ND		4.7	0.32	ug/L		08/28/13 14:50	08/30/13 10:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol	*78*		*39 - 146*	*08/28/13 14:50*	*08/30/13 10:17*	*1*
2-Fluorobiphenyl	*69*		*37 - 120*	*08/28/13 14:50*	*08/30/13 10:17*	*1*
2-Fluorophenol	*53*		*18 - 120*	*08/28/13 14:50*	*08/30/13 10:17*	*1*
Nitrobenzene-d5	*68*		*34 - 132*	*08/28/13 14:50*	*08/30/13 10:17*	*1*
p-Terphenyl-d14	*82*		*58 - 147*	*08/28/13 14:50*	*08/30/13 10:17*	*1*
Phenol-d5	*36*		*11 - 120*	*08/28/13 14:50*	*08/30/13 10:17*	*1*

Method: 6010B - Inductively Coupled Plasma - Atomic Emission Spectrometry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.064**	**J**	0.20	0.060	mg/L		08/28/13 08:40	08/28/13 18:34	1
Antimony	ND		0.020	0.0068	mg/L		08/28/13 08:40	08/28/13 18:34	1
Arsenic	ND		0.010	0.0056	mg/L		08/28/13 08:40	08/28/13 18:34	1
Barium	**0.70**		0.0020	0.00070	mg/L		08/28/13 08:40	08/28/13 18:34	1
Beryllium	ND		0.0020	0.00030	mg/L		08/28/13 08:40	08/28/13 18:34	1
Cadmium	ND		0.0010	0.00050	mg/L		08/28/13 08:40	08/28/13 18:34	1
Calcium	**374**		0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:34	1
Chromium	**0.0023**	**J**	0.0040	0.0010	mg/L		08/28/13 08:40	08/28/13 18:34	1
Cobalt	ND		0.0040	0.00063	mg/L		08/28/13 08:40	08/28/13 18:34	1
Copper	**0.0024**	**J**	0.010	0.0016	mg/L		08/28/13 08:40	08/28/13 18:34	1
Iron	**14.1**	**B7**	0.050	0.019	mg/L		08/28/13 08:40	08/28/13 18:34	1
Lead	ND		0.0050	0.0030	mg/L		08/28/13 08:40	08/28/13 18:34	1
Magnesium	**64.4**		0.20	0.043	mg/L		08/28/13 08:40	08/28/13 18:34	1
Manganese	**0.75**	**B**	0.0030	0.00040	mg/L		08/28/13 08:40	08/28/13 18:34	1
Nickel	ND		0.010	0.0013	mg/L		08/28/13 08:40	08/28/13 18:34	1
Potassium	**46.8**	**B**	0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:34	1
Selenium	ND		0.015	0.0087	mg/L		08/28/13 08:40	08/28/13 18:34	1
Silver	ND		0.0030	0.0017	mg/L		08/28/13 08:40	08/28/13 18:34	1

Client Sample ID: AW-04

Date Collected: 08/27/13 16:40
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-4
Matrix: Water

Method: 6010B - Inductively Coupled Plasma - Atomic Emission Spectrometry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	631		1.0	0.32	mg/L		08/28/13 08:40	08/28/13 18:34	1
Thallium	ND		0.020	0.010	mg/L		08/28/13 08:40	08/28/13 18:34	1
Vanadium	0.0057		0.0050	0.0015	mg/L		08/28/13 08:40	08/28/13 18:34	1
Zinc	0.010 ~~0.0023~~	~~J B~~ UB	0.010	0.0015	mg/L		08/28/13 08:40	08/28/13 18:34	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		08/28/13 07:50	08/28/13 12:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	0.064		0.010	0.0050	mg/L		08/29/13 08:58	08/30/13 15:41	1

Client Sample ID: FD-01-082713

Date Collected: 08/27/13 00:00
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		4.0	3.3	ug/L			09/05/13 19:54	4
1,1,2,2-Tetrachloroethane	ND		4.0	0.84	ug/L			09/05/13 19:54	4
1,1,2-Trichloroethane	ND		4.0	0.92	ug/L			09/05/13 19:54	4
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		4.0	1.2	ug/L			09/05/13 19:54	4
1,1-Dichloroethane	ND		4.0	1.5	ug/L			09/05/13 19:54	4
1,1-Dichloroethene	ND		4.0	1.2	ug/L			09/05/13 19:54	4
1,2,4-Trichlorobenzene	ND		4.0	1.6	ug/L			09/05/13 19:54	4
1,2-Dibromo-3-Chloropropane	ND	UJ	4.0	1.6	ug/L			09/05/13 19:54	4
1,2-Dibromoethane	ND		4.0	2.9	ug/L			09/05/13 19:54	4
1,2-Dichlorobenzene	ND		4.0	3.2	ug/L			09/05/13 19:54	4
1,2-Dichloroethane	ND		4.0	0.84	ug/L			09/05/13 19:54	4
1,2-Dichloropropane	ND		4.0	2.9	ug/L			09/05/13 19:54	4
1,3-Dichlorobenzene	ND		4.0	3.1	ug/L			09/05/13 19:54	4
1,4-Dichlorobenzene	ND		4.0	3.4	ug/L			09/05/13 19:54	4
2-Hexanone	ND		20	5.0	ug/L			09/05/13 19:54	4
2-Butanone (MEK)	ND		40	5.3	ug/L			09/05/13 19:54	4
4-Methyl-2-pentanone (MIBK)	ND		20	8.4	ug/L			09/05/13 19:54	4
Acetone	ND		40	12	ug/L			09/05/13 19:54	4
Benzene	4.9		4.0	1.6	ug/L			09/05/13 19:54	4
Bromodichloromethane	ND		4.0	1.6	ug/L			09/05/13 19:54	4
Bromoform	ND	UJ	4.0	1.0	ug/L			09/05/13 19:54	4
Bromomethane	ND		4.0	2.8	ug/L			09/05/13 19:54	4
Carbon disulfide	ND	UJ	4.0	0.76	ug/L			09/05/13 19:54	4
Carbon tetrachloride	ND		4.0	1.1	ug/L			09/05/13 19:54	4
Chlorobenzene	ND		4.0	3.0	ug/L			09/05/13 19:54	4
Dibromochloromethane	ND		4.0	1.3	ug/L			09/05/13 19:54	4
Chloroethane	ND		4.0	1.3	ug/L			09/05/13 19:54	4
Chloroform	ND		4.0	1.4	ug/L			09/05/13 19:54	4
Chloromethane	ND		4.0	1.4	ug/L			09/05/13 19:54	4
cis-1,2-Dichloroethene	ND		4.0	3.2	ug/L			09/05/13 19:54	4
cis-1,3-Dichloropropene	ND		4.0	1.4	ug/L			09/05/13 19:54	4

Client Sample ID: FD-01-082713
Date Collected: 08/27/13 00:00
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyclohexane	ND	UJ	4.0	0.72	ug/L			09/05/13 19:54	4
Dichlorodifluoromethane	ND		4.0	2.7	ug/L			09/05/13 19:54	4
Ethylbenzene	ND		4.0	3.0	ug/L			09/05/13 19:54	4
Isopropylbenzene	ND		4.0	3.2	ug/L			09/05/13 19:54	4
Methyl acetate	ND		4.0	2.0	ug/L			09/05/13 19:54	4
Methyl tert-butyl ether	ND		4.0	0.64	ug/L			09/05/13 19:54	4
Methylcyclohexane	ND		4.0	0.64	ug/L			09/05/13 19:54	4
Methylene Chloride	ND		4.0	1.8	ug/L			09/05/13 19:54	4
Styrene	ND		4.0	2.9	ug/L			09/05/13 19:54	4
Tetrachloroethene	ND		4.0	1.4	ug/L			09/05/13 19:54	4
Toluene	ND		4.0	2.0	ug/L			09/05/13 19:54	4
trans-1,2-Dichloroethene	ND		4.0	3.6	ug/L			09/05/13 19:54	4
trans-1,3-Dichloropropene	ND		4.0	1.5	ug/L			09/05/13 19:54	4
Trichloroethene	ND		4.0	1.8	ug/L			09/05/13 19:54	4
Trichlorofluoromethane	ND		4.0	3.5	ug/L			09/05/13 19:54	4
Vinyl chloride	ND		4.0	3.6	ug/L			09/05/13 19:54	4
Xylenes, Total	ND		8.0	2.6	ug/L			09/05/13 19:54	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*66 - 137*		*09/05/13 19:54*	*4*
Toluene-d8 (Surr)	*108*		*71 - 126*		*09/05/13 19:54*	*4*
4-Bromofluorobenzene (Surr)	*106*		*73 - 120*		*09/05/13 19:54*	*4*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	1.1	J	4.8	0.63	ug/L		08/28/13 14:50	08/30/13 10:44	1
bis (2-chloroisopropyl) ether	ND		4.8	0.50	ug/L		08/28/13 14:50	08/30/13 10:44	1
2,4,5-Trichlorophenol	ND		4.8	0.46	ug/L		08/28/13 14:50	08/30/13 10:44	1
2,4,6-Trichlorophenol	ND		4.8	0.59	ug/L		08/28/13 14:50	08/30/13 10:44	1
2,4-Dichlorophenol	ND		4.8	0.49	ug/L		08/28/13 14:50	08/30/13 10:44	1
2,4-Dimethylphenol	ND		4.8	0.48	ug/L		08/28/13 14:50	08/30/13 10:44	1
2,4-Dinitrophenol	ND		9.7	2.1	ug/L		08/28/13 14:50	08/30/13 10:44	1
2,4-Dinitrotoluene	ND		4.8	0.43	ug/L		08/28/13 14:50	08/30/13 10:44	1
2,6-Dinitrotoluene	ND	* UJ	4.8	0.39	ug/L		08/28/13 14:50	08/30/13 10:44	1
2-Chloronaphthalene	ND		4.8	0.44	ug/L		08/28/13 14:50	08/30/13 10:44	1
2-Chlorophenol	ND		4.8	0.51	ug/L		08/28/13 14:50	08/30/13 10:44	1
2-Methylnaphthalene	ND		4.8	0.58	ug/L		08/28/13 14:50	08/30/13 10:44	1
2-Methylphenol	ND		4.8	0.39	ug/L		08/28/13 14:50	08/30/13 10:44	1
2-Nitroaniline	ND		9.7	0.41	ug/L		08/28/13 14:50	08/30/13 10:44	1
2-Nitrophenol	ND		4.8	0.46	ug/L		08/28/13 14:50	08/30/13 10:44	1
3,3'-Dichlorobenzidine	ND		4.8	0.39	ug/L		08/28/13 14:50	08/30/13 10:44	1
3-Nitroaniline	ND	* UJ	9.7	0.46	ug/L		08/28/13 14:50	08/30/13 10:44	1
4,6-Dinitro-2-methylphenol	ND		9.7	2.1	ug/L		08/28/13 14:50	08/30/13 10:44	1
4-Bromophenyl phenyl ether	ND	* UJ	4.8	0.44	ug/L		08/28/13 14:50	08/30/13 10:44	1
4-Chloro-3-methylphenol	ND		4.8	0.44	ug/L		08/28/13 14:50	08/30/13 10:44	1
4-Chloroaniline	ND	* UJ	4.8	0.57	ug/L		08/28/13 14:50	08/30/13 10:44	1
4-Chlorophenyl phenyl ether	ND		4.8	0.34	ug/L		08/28/13 14:50	08/30/13 10:44	1
4-Methylphenol	ND		9.7	0.35	ug/L		08/28/13 14:50	08/30/13 10:44	1
4-Nitroaniline	ND	* UJ	9.7	0.24	ug/L		08/28/13 14:50	08/30/13 10:44	1
4-Nitrophenol	ND		9.7	1.5	ug/L		08/28/13 14:50	08/30/13 10:44	1

Client Sample ID: FD-01-082713
Date Collected: 08/27/13 00:00
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-5
Matrix: Water

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**41**		4.8	0.40	ug/L		08/28/13 14:50	08/30/13 10:44	1
Acenaphthylene	**0.40**	**J**	4.8	0.37	ug/L		08/28/13 14:50	08/30/13 10:44	1
Acetophenone	ND		4.8	0.52	ug/L		08/28/13 14:50	08/30/13 10:44	1
Anthracene	**5.0**		4.8	0.27	ug/L		08/28/13 14:50	08/30/13 10:44	1
Atrazine	ND		4.8	0.44	ug/L		08/28/13 14:50	08/30/13 10:44	1
Benzaldehyde	**0.41**	**J**	4.8	0.26	ug/L		08/28/13 14:50	08/30/13 10:44	1
Benzo[a]anthracene	**0.36**	**J**	4.8	0.35	ug/L		08/28/13 14:50	08/30/13 10:44	1
Benzo[a]pyrene	ND		4.8	0.45	ug/L		08/28/13 14:50	08/30/13 10:44	1
Benzo[b]fluoranthene	ND		4.8	0.33	ug/L		08/28/13 14:50	08/30/13 10:44	1
Benzo[g,h,i]perylene	ND		4.8	0.34	ug/L		08/28/13 14:50	08/30/13 10:44	1
Benzo[k]fluoranthene	ND		4.8	0.71	ug/L		08/28/13 14:50	08/30/13 10:44	1
Bis(2-chloroethoxy)methane	ND		4.8	0.34	ug/L		08/28/13 14:50	08/30/13 10:44	1
Bis(2-chloroethyl)ether	ND		4.8	0.39	ug/L		08/28/13 14:50	08/30/13 10:44	1
Bis(2-ethylhexyl) phthalate	ND		4.8	1.7	ug/L		08/28/13 14:50	08/30/13 10:44	1
Butyl benzyl phthalate	ND		4.8	0.41	ug/L		08/28/13 14:50	08/30/13 10:44	1
Caprolactam	ND		4.8	2.1	ug/L		08/28/13 14:50	08/30/13 10:44	1
Carbazole	**4.8**		4.8	0.29	ug/L		08/28/13 14:50	08/30/13 10:44	1
Chrysene	ND		4.8	0.32	ug/L		08/28/13 14:50	08/30/13 10:44	1
Di-n-butyl phthalate	**0.66**	**J**	4.8	0.30	ug/L		08/28/13 14:50	08/30/13 10:44	1
Di-n-octyl phthalate	ND		4.8	0.45	ug/L		08/28/13 14:50	08/30/13 10:44	1
Dibenz(a,h)anthracene	ND		4.8	0.41	ug/L		08/28/13 14:50	08/30/13 10:44	1
Dibenzofuran	**16**		9.7	0.49	ug/L		08/28/13 14:50	08/30/13 10:44	1
Diethyl phthalate	ND		4.8	0.21	ug/L		08/28/13 14:50	08/30/13 10:44	1
Dimethyl phthalate	ND		4.8	0.35	ug/L		08/28/13 14:50	08/30/13 10:44	1
Fluoranthene	**5.9**		4.8	0.39	ug/L		08/28/13 14:50	08/30/13 10:44	1
Fluorene	**23**		4.8	0.35	ug/L		08/28/13 14:50	08/30/13 10:44	1
Hexachlorobenzene	ND		4.8	0.49	ug/L		08/28/13 14:50	08/30/13 10:44	1
Hexachlorobutadiene	ND		4.8	0.66	ug/L		08/28/13 14:50	08/30/13 10:44	1
Hexachlorocyclopentadiene	ND		4.8	0.57	ug/L		08/28/13 14:50	08/30/13 10:44	1
Hexachloroethane	ND		4.8	0.57	ug/L		08/28/13 14:50	08/30/13 10:44	1
Indeno[1,2,3-cd]pyrene	ND		4.8	0.45	ug/L		08/28/13 14:50	08/30/13 10:44	1
Isophorone	ND		4.8	0.42	ug/L		08/28/13 14:50	08/30/13 10:44	1
N-Nitrosodi-n-propylamine	ND		4.8	0.52	ug/L		08/28/13 14:50	08/30/13 10:44	1
N-Nitrosodiphenylamine	ND		4.8	0.49	ug/L		08/28/13 14:50	08/30/13 10:44	1
Naphthalene	ND		4.8	0.73	ug/L		08/28/13 14:50	08/30/13 10:44	1
Nitrobenzene	ND		4.8	0.28	ug/L		08/28/13 14:50	08/30/13 10:44	1
Pentachlorophenol	ND		9.7	2.1	ug/L		08/28/13 14:50	08/30/13 10:44	1
Phenanthrene	**23**	**B**	4.8	0.43	ug/L		08/28/13 14:50	08/30/13 10:44	1
Phenol	ND		4.8	0.38	ug/L		08/28/13 14:50	08/30/13 10:44	1
Pyrene	**2.6**	**J**	4.8	0.33	ug/L		08/28/13 14:50	08/30/13 10:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol	*100*		*39 - 146*	*08/28/13 14:50*	*08/30/13 10:44*	*1*
2-Fluorobiphenyl	*86*		*37 - 120*	*08/28/13 14:50*	*08/30/13 10:44*	*1*
2-Fluorophenol	*62*		*18 - 120*	*08/28/13 14:50*	*08/30/13 10:44*	*1*
Nitrobenzene-d5	*88*		*34 - 132*	*08/28/13 14:50*	*08/30/13 10:44*	*1*
p-Terphenyl-d14	*97*		*58 - 147*	*08/28/13 14:50*	*08/30/13 10:44*	*1*
Phenol-d5	*42*		*11 - 120*	*08/28/13 14:50*	*08/30/13 10:44*	*1*

Client Sample ID: FD-01-082713

Lab Sample ID: 480-44645-5

Date Collected: 08/27/13 00:00

Matrix: Water

Date Received: 08/27/13 18:20

Method: 6010B - Inductively Coupled Plasma - Atomic Emission Spectrometry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.20	0.060	mg/L		08/28/13 08:40	08/28/13 18:37	1
Antimony	ND		0.020	0.0068	mg/L		08/28/13 08:40	08/28/13 18:37	1
Arsenic	ND		0.010	0.0056	mg/L		08/28/13 08:40	08/28/13 18:37	1
Barium	**0.063**		0.0020	0.00070	mg/L		08/28/13 08:40	08/28/13 18:37	1
Beryllium	ND		0.0020	0.00030	mg/L		08/28/13 08:40	08/28/13 18:37	1
Cadmium	ND		0.0010	0.00050	mg/L		08/28/13 08:40	08/28/13 18:37	1
Calcium	**243**		0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:37	1
Chromium	**0.0022**	**J**	0.0040	0.0010	mg/L		08/28/13 08:40	08/28/13 18:37	1
Cobalt	ND		0.0040	0.00063	mg/L		08/28/13 08:40	08/28/13 18:37	1
Copper	**0.0017**	**J**	0.010	0.0016	mg/L		08/28/13 08:40	08/28/13 18:37	1
Iron	**16.1**	**B7**	0.050	0.019	mg/L		08/28/13 08:40	08/28/13 18:37	1
Lead	ND		0.0050	0.0030	mg/L		08/28/13 08:40	08/28/13 18:37	1
Magnesium	**13.6**		0.20	0.043	mg/L		08/28/13 08:40	08/28/13 18:37	1
Manganese	**0.75**	**B**	0.0030	0.00040	mg/L		08/28/13 08:40	08/28/13 18:37	1
Nickel	ND		0.010	0.0013	mg/L		08/28/13 08:40	08/28/13 18:37	1
Potassium	**10.0**	**B**	0.50	0.10	mg/L		08/28/13 08:40	08/28/13 18:37	1
Selenium	ND		0.015	0.0087	mg/L		08/28/13 08:40	08/28/13 18:37	1
Silver	ND		0.0030	0.0017	mg/L		08/28/13 08:40	08/28/13 18:37	1
Sodium	**337**		1.0	0.32	mg/L		08/28/13 08:40	08/28/13 18:37	1
Thallium	ND		0.020	0.010	mg/L		08/28/13 08:40	08/28/13 18:37	1
Vanadium	**0.0028**	**J**	0.0050	0.0015	mg/L		08/28/13 08:40	08/28/13 18:37	1
Zinc	0.010 ~~0.0016~~	~~J B~~ UB	0.010	0.0015	mg/L		08/28/13 08:40	08/28/13 18:37	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		08/28/13 07:50	08/28/13 12:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	**0.10**		0.010	0.0050	mg/L		08/29/13 08:58	08/30/13 15:42	1

Client Sample ID: TRIP BLANK

Lab Sample ID: 480-44645-6

Date Collected: 08/27/13 00:00

Matrix: Water

Date Received: 08/27/13 18:20

Method: 8260B - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/05/13 18:07	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/05/13 18:07	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/05/13 18:07	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.0	0.31	ug/L			09/05/13 18:07	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/05/13 18:07	1
1,1-Dichloroethene	ND		1.0	0.29	ug/L			09/05/13 18:07	1
1,2,4-Trichlorobenzene	ND		1.0	0.41	ug/L			09/05/13 18:07	1
1,2-Dibromo-3-Chloropropane	ND	UJ	1.0	0.39	ug/L			09/05/13 18:07	1
1,2-Dibromoethane	ND		1.0	0.73	ug/L			09/05/13 18:07	1
1,2-Dichlorobenzene	ND		1.0	0.79	ug/L			09/05/13 18:07	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/05/13 18:07	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/05/13 18:07	1
1,3-Dichlorobenzene	ND		1.0	0.78	ug/L			09/05/13 18:07	1

Client: ARCADIS U.S. Inc
Project/Site: National Fuel - 4th Street Buffalo

TestAmerica Job ID: 480-44645-1

Client Sample ID: TRIP BLANK
Date Collected: 08/27/13 00:00
Date Received: 08/27/13 18:20

Lab Sample ID: 480-44645-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds by GC/MS (Continued)

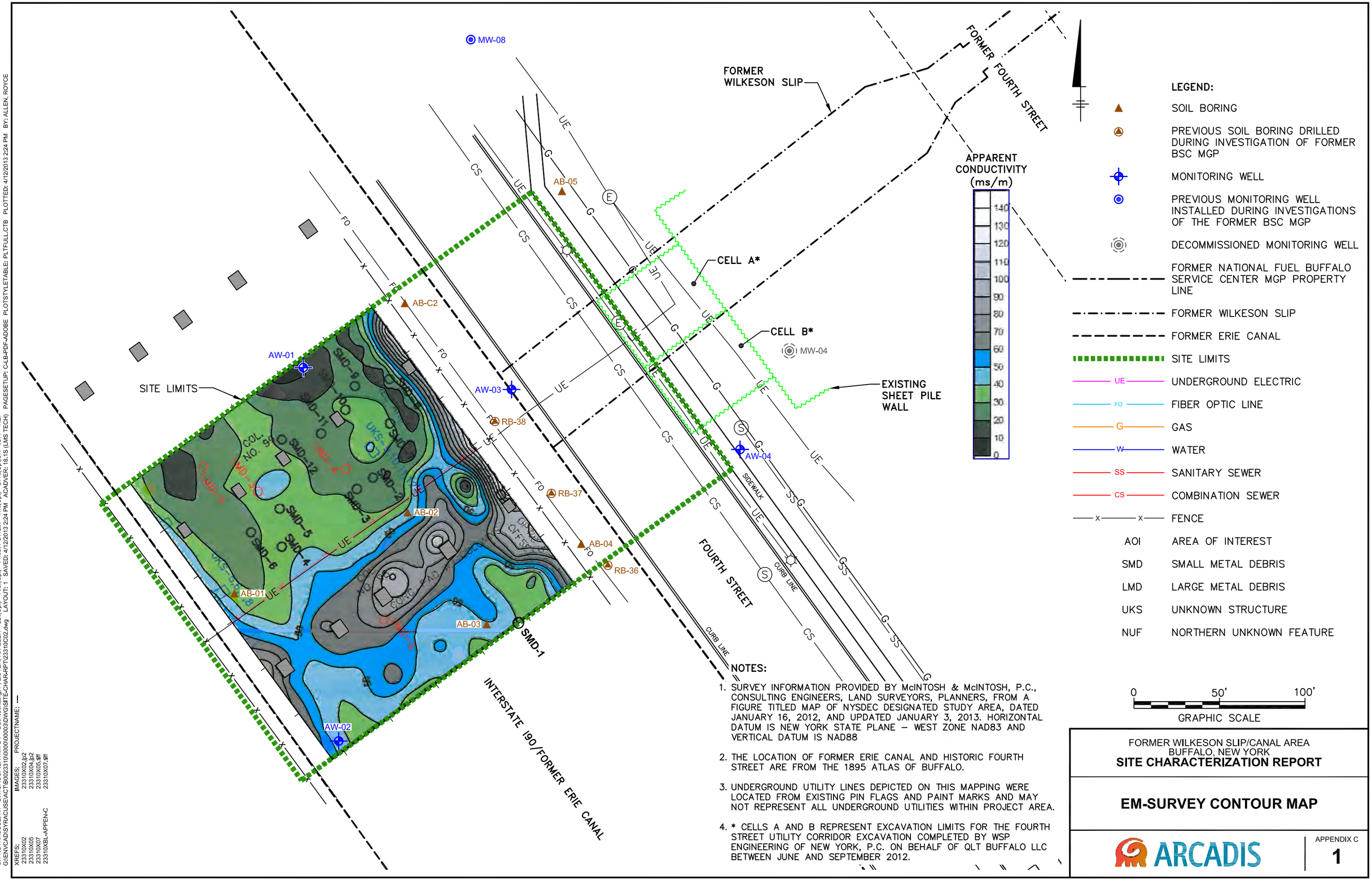
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		1.0	0.84	ug/L			09/05/13 18:07	1
2-Hexanone	ND		5.0	1.2	ug/L			09/05/13 18:07	1
2-Butanone (MEK)	ND		10	1.3	ug/L			09/05/13 18:07	1
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.1	ug/L			09/05/13 18:07	1
Acetone	ND		10	3.0	ug/L			09/05/13 18:07	1
Benzene	ND		1.0	0.41	ug/L			09/05/13 18:07	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/05/13 18:07	1
Bromoform	ND	UJ	1.0	0.26	ug/L			09/05/13 18:07	1
Bromomethane	ND		1.0	0.69	ug/L			09/05/13 18:07	1
Carbon disulfide	ND	UJ	1.0	0.19	ug/L			09/05/13 18:07	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/05/13 18:07	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/05/13 18:07	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/05/13 18:07	1
Chloroethane	ND		1.0	0.32	ug/L			09/05/13 18:07	1
Chloroform	ND		1.0	0.34	ug/L			09/05/13 18:07	1
Chloromethane	ND		1.0	0.35	ug/L			09/05/13 18:07	1
cis-1,2-Dichloroethene	ND		1.0	0.81	ug/L			09/05/13 18:07	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/05/13 18:07	1
Cyclohexane	ND	UJ	1.0	0.18	ug/L			09/05/13 18:07	1
Dichlorodifluoromethane	ND		1.0	0.68	ug/L			09/05/13 18:07	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/05/13 18:07	1
Isopropylbenzene	ND		1.0	0.79	ug/L			09/05/13 18:07	1
Methyl acetate	ND		1.0	0.50	ug/L			09/05/13 18:07	1
Methyl tert-butyl ether	ND		1.0	0.16	ug/L			09/05/13 18:07	1
Methylcyclohexane	ND		1.0	0.16	ug/L			09/05/13 18:07	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/05/13 18:07	1
Styrene	ND		1.0	0.73	ug/L			09/05/13 18:07	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/05/13 18:07	1
Toluene	ND		1.0	0.51	ug/L			09/05/13 18:07	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/05/13 18:07	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/05/13 18:07	1
Trichloroethene	ND		1.0	0.46	ug/L			09/05/13 18:07	1
Trichlorofluoromethane	ND		1.0	0.88	ug/L			09/05/13 18:07	1
Vinyl chloride	ND		1.0	0.90	ug/L			09/05/13 18:07	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/05/13 18:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*66 - 137*		*09/05/13 18:07*	*1*
Toluene-d8 (Surr)	*110*		*71 - 126*		*09/05/13 18:07*	*1*
4-Bromofluorobenzene (Surr)	*106*		*73 - 120*		*09/05/13 18:07*	*1*

ARCADIS

Appendix C

Results of Geophysical Study



LEGEND:

- SOIL BORING
- PREVIOUS SOIL BORING DRILLED DURING INVESTIGATION OF FORMER BSC MGP
- MONITORING WELL
- PREVIOUS MONITORING WELL INSTALLED DURING INVESTIGATIONS OF THE FORMER BSC MGP
- DECOMMISSIONED MONITORING WELL
- FORMER NATIONAL FUEL BUFFALO SERVICE CENTER MGP PROPERTY LINE
- FORMER WILKESON SLIP
- FORMER ERIE CANAL
- SITE LIMITS
- UE — UNDERGROUND ELECTRIC
- FO — FIBER OPTIC LINE
- G — GAS
- W — WATER
- SS — SANITARY SEWER
- CS — COMBINATION SEWER
- x — x — FENCE

AOI	AREA OF INTEREST
SMD	SMALL METAL DEBRIS
LMD	LARGE METAL DEBRIS
UKS	UNKNOWN STRUCTURE
NUF	NORTHERN UNKNOWN FEATURE

NOTES:

1. SURVEY INFORMATION PROVIDED BY McINTOSH & McINTOSH, P.C., CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, FROM A FIGURE TITLED MAP OF NYSDEC DESIGNATED STUDY AREA, DATED JANUARY 16, 2012, AND UPDATED JANUARY 3, 2013. HORIZONTAL DATUM IS NEW YORK STATE PLANE – WEST ZONE NAD83 AND VERTICAL DATUM IS NAD88
2. THE LOCATION OF FORMER ERIE CANAL AND HISTORIC FOURTH STREET ARE FROM THE 1895 ATLAS OF BUFFALO.
3. UNDERGROUND UTILITY LINES DEPICTED ON THIS MAPPING WERE LOCATED FROM EXISTING PIN FLAGS AND PAINT MARKS AND MAY NOT REPRESENT ALL UNDERGROUND UTILITIES WITHIN PROJECT AREA.
4. * CELLS A AND B REPRESENT EXCAVATION LIMITS FOR THE FOURTH STREET UTILITY CORRIDOR EXCAVATION COMPLETED BY WSP ENGINEERING OF NEW YORK, P.C. ON BEHALF OF QLT BUFFALO LLC BETWEEN JUNE AND SEPTEMBER 2012.

0 50' 100'

GRAPHIC SCALE

FORMER WILKESON SLIP/CANAL AREA
BUFFALO, NEW YORK
SITE CHARACTERIZATION REPORT

EM-SURVEY CONTOUR MAP

ARCADIS

APPENDIX C
1

CITY:SYRACUSE, NY DIV/GROUP:ENV/IM-DIV DB:A.Schilling, P. LISTER, R. ALLEN LD:(Opt) PIC:(Opt) PM:S. POWLIN TM:(Opt) LYR:(Opt)ON=*OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVE\B0023310\0000000003\DWG\SITE-CHAR-RPT\23310C02.dwg LAYOUT: 1 SAVED: 4/12/2013 2:24 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: C:\LB-PDF-ADOBE PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 4/12/2013 2:24 PM BY: ALLEN, ROYCE
XREFS: IMAGES: PROJECTNAME: —
23310X02 23310X02.jp2
23310X05 23310X04.jp2
23310X07 23310X05.tiff
23310XBL-APPEN-C 23310X07.tiff

Appendix D

Groundwater Sampling Logs

GROUNDWATER SAMPLING LOG

Site: Wilkeson Slip — ***National Fuel Buffalo, NY*** — ***Event:*** *August 2012 GW Sampling*

Sampling Personnel:	Nicholas (Klaus) Beyrle	**Well ID:**	AW-01
Client / Job Number:	Nat Fuel/ B0023310.0000	**Date:**	8.22.12
Weather:	Sunny, warm	**Time In:**	1155 **Time Out:** 1320

Well Information

Depth to Water:	9.16	(feet TIC)
Total Depth:	22.90	(feet TIC)
Length of Water Column:	13.74	(feet)
Volume of Water in Well:	2.23	(gal)
Screen Interval:		(feet)
Depth to pump Intake:		(feet TIC)

Well Type:	(Flushmount)	Stick-Up		
Well Material:	Stainless Steel	(PVC)		
Well Locked:	(Yes)	No		
Measuring Point Marked:	(Yes)	No		
Well Diameter:	1"	(2")	Other:	

Purging Information

Purging Method:	Bailer	(Peristaltic)	Bladder	Other:
Tubing/Bailer Material:	St. Steel	(Polyethylene)	Teflon	Other:
Sampling Method:	(1" ~~Bailer~~)	(Peristaltic)	Bladder	Other:

Duration of Pumping:	75	(min)		
Average Pumping Rate:	200	(ml/min)	Water-Quality Meter Type:	YSI/Lamotte 2020
Total Volume Removed:	3.0	(gal)	Did well go dry:	Yes (No)

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3785 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter:	1	2	3	4	5	6	7	8	9	10	11	12	13
	1200	1205	1215	1225	1230	1235	1240	1245	1250				
Volume Purged (gal)								3.0					
Rate (mL/min)	200	200	200	200	200	200	200	200	S				
Depth to Water (ft.)	9.38	9.37	9.37	9.37	9.37	9.37	9.37	9.37	A				
pH	6.80	6.76	6.71	6.70	6.70	6.70	6.70	6.70	M				
Temp. (C)	16.6	16.6	16.5	16.6	16.5	16.5	16.5	16.5	L				
Conductivity (mS/cm)	4.20	3.95	3.86	3.87	3.88	3.89	3.89	3.90	E				
Dissolved Oxygen (mg/l)	0.44	0.26	0.12	0.10	0.10	0.10	0.09	0.09					
ORP (mV)	-93.9	-103.9	-113.4	-119.2	-121.1	-121.7	-123.7	-124.9					
Turbidity (NTU)	4.08	12.4	12.5	6.48	3.24	2.79	2.67	2.59					
Notes:													

Sampling Information

Analyses	#	Laboratory
TCL VOC	3	Buffalo-Test America
TCL SVOC	2	Buffalo-Test America
TAL Metals	1	Buffalo-Test America
Total Cn	1	Buffalo-Test America
Free Cn	1	Buffalo-Test America
Sample ID: AW-01		Sample Time: 1250
MS/MSD:	Yes	(No)
Duplicate:	(Yes)	No
Duplicate ID DUP-082212		Dup. Time: 1250
Chain of Custody Signed By:		

Problems / Observations

Initial Purge: Clear, Colorless ~~odor~~ slight odor

Final Purge: Same

Notes:

GROUNDWATER SAMPLING LOG

Site: Wilkeson Slip — ***National Fuel Buffalo, NY*** — ***Event:*** *August 2012 GW Sampling*

Sampling Personnel:	Nicholas (Klaus) Beyrle	**Well ID:**	AW-02
Client / Job Number:	Nat Fuel/ B0023310.0000	**Date:**	8/22/12
Weather:	Sunny, 75°F	**Time In:**	1000 **Time Out:** 1145

Well Information

Depth to Water:	9.29	(feet TIC)
Total Depth:	20.43	(feet TIC)
Length of Water Column:	11.14	(feet)
Volume of Water in Well:	1.81	(gal)
Screen Interval:		(feet)
Depth to pump Intake:		(feet TIC)

Well Type:	(Flushmount)	Stick-Up	
Well Material:	Stainless Steel	(PVC)	
Well Locked:	(Yes)	No	
Measuring Point Marked:	(Yes)	No	
Well Diameter:	1"	(2")	Other:

Purging Information

Purging Method:	Bailer	(Peristaltic)	Bladder	Other:
Tubing/Bailer Material:	St. Steel	(Polyethylene)	Teflon	Other:
Sampling Method:	(Bailer)	Peristaltic	Bladder	Other:

Duration of Pumping:	90	(min)	
Average Pumping Rate:	~~280~~ 250	(ml/min)	Water-Quality Meter Type: YSI/Lamotte 2020
Total Volume Removed:	3.0	(gal)	Did well go dry: Yes (No)

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3785 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter:	1	2	3	4	5	6	7	8	9	10	11	12	13
	1015	1020	1025	1030	1035	1040	1045	1050	1055	1100			
Volume Purged (gal)									3.6				
Rate (mL/min)	~~140~~	~~140~~	~~140~~	~~140~~	~~140~~	~~140~~	~~140~~	~~140~~	140	S	→ Pump Rate = 250 mL/min		
Depth to Water (ft.)	9.43	9.45	9.45	9.45	9.45	9.46	9.46	9.46	9.47	A			
pH	6.42	6.42	6.42	6.43	6.44	6.45	6.45	6.46	6.46	M			
Temp. (C)	14.8	14.8	14.7	14.6	14.6	14.5	14.6	14.6	14.6	P			
Conductivity (mS/cm)	37.00	37.05	37.10	37.18	37.18	37.21	37.07	37.08	37.09	L			
Dissolved Oxygen (mg/l)	0.61	0.24	0.19	0.15	0.13	0.12	0.12	0.12	0.11	E			
ORP (mV)	-125.1	-134.4	-135.4	-138.4	-139.2	-138.3	-128.4	-127.6	-126.7				
Turbidity (NTU)	9.72	16.1	15.3	11.19	9.75	6.80	6.37	6.12	6.07				
Notes:													

Sampling Information

Analyses	#	Laboratory
TCL VOC	3	Buffalo-Test America
TCL SVOC	2	Buffalo-Test America
TAL Metals	1	Buffalo-Test America
Total Cn	1	Buffalo-Test America
Free Cn	1	Buffalo-Test America
Sample ID: AW-02		Sample Time: 1100
MS/MSD:	(Yes)	No
Duplicate:	Yes	(No)
Duplicate ID		Dup. Time:
Chain of Custody Signed By:		

Problems / Observations

Initial Purge: Clear, cloudy, odor

Final Purge: Same

Notes:

National Fuel, 4th St, Buffalo, NY — Site

2012 GW Sampling — Event

GROUNDWATER SAMPLING LOG

Sampling Personnel: ADAM LAVELLE/STEVE DICKINSON
Well ID: AW-03
Client / Job Number: National Fuel/B0023310.0000
Date: 12/28/12
Weather: 25°F, OVERCAST, LIGHT SNOW
Time In: 1350 **Time Out:** 1525

Well Information

Depth to Water:	(feet)	6.75	(from MP)
Total Depth:	(feet)	18.23	(from MP)
Length of Water Column:	(feet)	11.48	
Volume of Water in Well:	(gal)	1.8	
Intake depth for tubing:	(feet)	14'	

Well Type:	Flushmount	☒	Stick-Up	☐	
Well Material:	Stainless Steel	☐	PVC	☒	
Well Locked:	Yes	☒	No	☐	
Measuring Point Marked:	Yes	☒	No	☐	
Well Diameter:	1"	(2")	Other:		

Purging Information

Purging Method:	Bailer	☐	Peristaltic	☒	Monsoon	☐	Other:
Tubing/Bailer Material:	Steel	☐	Polyethylene	☒	Teflon	☐	Other:
Sampling Method:	Bailer	☒ VOCs	Peristaltic	☒	Monsoon	☐	Other:

Pump Start Time: 13:58
Pump Stop Time: 1431
Water-Quality Meter Type: ECO RENTAL YSI
Total Volume Removed: 2.5 (gal)
Did well go dry: Yes ☐ No ☒

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3785 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO / Turb	Cond. /Temp	ORP
∀ 0.1	∀ 10%	∀ 3.0%	∀ 10 mV

Parameter:	1	2	3	4	5	6	7	8	9
Time	1400	1405	1410	1415	1420	1425	1430		
Volume Purged (Gal)	0	0.35	0.85	1.20	1.60	1.95	2.30		
Rate (mL/min)	300	300	320	320	320	320	320		
Depth to Water (ft.)	6.75	6.76	6.76	6.76	6.76	6.76	6.76		
pH	7.50	6.79	6.81	6.81	6.81	6.80	6.79		
Temp. (C)	11.2	12.3	13.1	13.1	13.2	13.1	13.2		
Conductivity (mS/cm)	3.39	3.50	3.42	3.41	3.39	3.39	3.38		
Dissolved Oxygen (mg/L)	3.42	0.69	0.39	0.33	0.25	0.28	0.26		
ORP (mV)	-0.6	-49.2	-60.7	-63.6	-65.1	-65.4	-65.2		
Turbidity (NTU)	48.8	634AU	11.28	8.73	9.31	6.52	5.98		
Notes:									

Sampling Information

Analyses	#	n	Laboratory
VOCs-Method 8260B	1	3	Accutest Labs - MA

Color: GRAY
Odor: SLIGHT
Appearance: TURBID - SLIGHT
Sample ID: AW-03 Sample Time: 1445
MS/MSD: Yes ☐ No ☒
Duplicate: Yes ☒ No ☐
Duplicate ID DUP Dup. Time: 1445
Chain of Custody Signed By: AL

~~System ON/OFF:~~

Problems / Observations

11.48
x .16
6888
11480
1.8368

National Fuel, 4th St, Buffalo, NY — Site

2012 GW Sampling — Event

GROUNDWATER SAMPLING LOG

Sampling Personnel: ADAM LAVELLE / STEVE DICKINSON
Well ID: AW-04
Client / Job Number: National Fuel/B0023310.0000
Date: 12/28/12
Weather: 25°F, OVERCAST, LIGHT SNOW
Time In: ~~1357~~ 1345 Time Out: 1530

Well Information

Depth to Water:	(feet)	~~21.90~~ 10.61	(from MP)
Total Depth:	(feet)	21.40	(from MP)
Length of Water Column:	(feet)	10.79	
Volume of Water in Well:	(gal)	1.73	
Intake depth for tubing:	(feet)	17.5	

Well Type:	Flushmount	☒	Stick-Up	☐	
Well Material:	Stainless Steel	☐	PVC	☒	
Well Locked:	Yes	☐	No	☒	
Measuring Point Marked:	Yes	☐	No	☒	
Well Diameter:	1"	(2")	Other:		

Purging Information

Purging Method:	Bailer	☐	Peristaltic	☒	Monsoon	☐	Other:
Tubing/Bailer Material:	Steel	☐	Polyethylene	☒	Teflon	☐	Other:
Sampling Method:	Bailer	☒ VOC	Peristaltic	☒	Monsoon	☐	Other:

Pump Start Time: 1356
Pump Stop Time: 1437
Water-Quality Meter Type: ECO RENTAL YSI
Total Volume Removed: 2.5 (gal)
Did well go dry: Yes ☐ No ☐

Conversion Factors

gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469

1 gal = 3.785 L = 3785 ml = 0.1337 cubic feet

Unit Stability

pH	DO / Turb	Cond. /Temp	ORP
∀ 0.1	∀ 10%	∀ 3.0%	∀ 10 mV

Parameter:	1	2	3	4	5	6	7	8	9
Time	1357	1402	1407	1412	1417	1422	1427	1432	
Volume Purged (Gal)									
Rate (mL/min)	~~250~~ ml/min	→	→	→	→	→	→	→	
Depth to Water (ft.)	—	—	—	—					
pH	6.89	6.90	6.88	6.88	6.87	6.86	6.86	6.89	
Temp. (C)	13.3	12.9	12.9	13.0	13.1	13.0	12.2	12.0	
Conductivity (mS/cm)	6.53	6.39	6.30	6.23	6.14	6.07	6.12	6.10	
Dissolved Oxygen (mg/L)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	
ORP (mV)	-85.1	-92.9	-98.2	-111.4	-121.0	-130.0	-132.4	-133.5	
Turbidity (NTU)	3.83	4.06	5.13	5.03	4.25	3.30	2.70	2.60	
Notes:									

Sampling Information

Analyses	#	n	Laboratory
VOCs-Method 8260B	1	3	~~Accutest Labs - MA~~ TA - BUF

Color: Slight Brown
Odor: Slight odor / musty - H2S
Appearance:
Sample ID: AW-04 Sample Time: 1510
MS/MSD: Yes ☒ No ☐ MS/MSD
Duplicate: Yes ☐ No ☒
Duplicate ID: Dup. Time:
Chain of Custody Signed By:

Problems / Observations

10.79
X .16
6474
10790
1.7264

System ON/OFF:

GROUNDWATER SAMPLING LOG

Site: Wilkeson Slip — ***National Fuel Buffalo, NY*** — ***Event:*** *August 2013 GW Sampling*

Sampling Personnel:	Jeff Brayer, Andrew Fleming	**Well ID:**	AW-01
Client / Job Number:	Nat Fuel/ B0023310.0000	**Date:**	8/27/13
Weather:	Overcast, 70's	**Time In:** 12:19	**Time Out:** 13:50

Well Information

Depth to Water:	8.33	(feet TIC)
Total Depth:	22.95	(feet TIC)
Length of Water Column:	14.57	(feet)
Volume of Water in Well:	2.45	(gal)
Screen Interval:	10	(feet)
Depth to pump Intake:	—	(feet TIC)

Well Type:	(Flushmount)	Stick-Up	
Well Material:	Stainless Steel	(PVC)	
Well Locked:	(Yes)	No	
Measuring Point Marked:	(Yes)	No	
Well Diameter:	1"	(2")	Other:

Purging Information

Purging Method:	Bailer	(Peristaltic)	Bladder	Other:
Tubing/Bailer Material:	St. Steel	(Polyethylene)	Teflon	Other:
Sampling Method:	(Bailer)	(Peristaltic)	Bladder	Other:

Duration of Pumping: 100 (min)

Average Pumping Rate: 370 (ml/min) — Water-Quality Meter Type: (YSI) Lamotte 2020

Total Volume Removed: 8.5 ~~10~~ ~~10~~ (gal) — Did well go dry: Yes (No)

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3785 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter:	1	2 1v	3 2v	4 3v	5	6	7	8	9	10	11	12	13
Volume Purged (gal)	0	2.75	5.00	7.40									
Rate (mL/min) 370	~~370~~	370	370	370									
Depth to Water (ft.)	8.39	8.41	8.41	8.41									
pH	6.93	6.63	6.63	6.63									
Temp. (C)	15.5	15.0	15.1	15.1									
Conductivity (mS/cm)	4.37	4.08	4.08	4.06									
Dissolved Oxygen (mg/l)	.91	.75	.15	.05									
ORP (mV)	-78.5	-107.1	-118.1	-120.7									
Turbidity (NTU)	1.70	1.43	1.13	1.45									
Notes: time	12:19	12:53	13:14	13:40									

Sampling Information

Analyses	#	Laboratory
TCL VOC	3	Buffalo-Test America
TCL SVOC	2	Buffalo-Test America
TAL Metals	1	Buffalo-Test America
Total Cn	1	Buffalo-Test America
~~Free Cn~~ Total Cn	1	Buffalo-Test America
Sample ID: AW01		Sample Time: 13:40
MS/MSD: (Yes)	No	
Duplicate: Yes	(No)	
Duplicate ID		Dup. Time:
Chain of Custody Signed By:		

Problems / Observations

Initial Purge: Sample Time: 13:40

Final Purge:

Notes: MS/MSD

Petroleum like odor on purge water
- No Sheen observed
- Solid tone on interface probe - False Read

GROUNDWATER SAMPLING LOG

Site: Wilkeson Slip | ***National Fuel Buffalo, NY*** | ***Event:*** *August 2013 GW Sampling*

Sampling Personnel:	Jeff Brayer, Andrew Fleming	**Well ID:**	AW-02		
Client / Job Number:	Nat Fuel/ B0023310.0000	**Date:**	8/27/13		
Weather:	Overcast, 70's	**Time In:**	10:23	**Time Out:**	11:50

Well Information

Depth to Water:	8.90	(feet TIC)
Total Depth:	20.43	(feet TIC)
Length of Water Column:	11.53	(feet)
Volume of Water in Well:	1.88	(gal)
Screen Interval:	10	(feet)
Depth to pump Intake:	—	(feet TIC)

Well Type:	(Flushmount)	Stick-Up	
Well Material:	Stainless Steel	(PVC)	
Well Locked:	(Yes)	No	
Measuring Point Marked:	(Yes)	No	
Well Diameter:	1"	(2")	Other:

Purging Information

Purging Method:	Bailer	(Peristaltic)	Bladder	Other:
Tubing/Bailer Material:	St. Steel	(Polyethylene)	Teflon	Other:
Sampling Method:	(Bailer)	(Peristaltic)	Bladder	Other:

Duration of Pumping: 72 min (min)

Average Pumping Rate: 425 (ml/min) Water-Quality Meter Type: (YSI) Lamotte 2020

Total Volume Removed: 8 (gal) Did well go dry: Yes (No)

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3785 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter:	1 Initial	2 1V	3 2V	4 3V	5 4V	6	7	8	9	10	11	12	13
Volume Purged (gal)	0	1.88	3.9	5.75	7.65								
Rate (mL/min)	425	425	425	425	425								
Depth to Water (ft.)	9.35	9.56	9.52	9.45	9.40								
pH	6.71	6.74	6.79	6.81	6.81								
Temp. (C)	14.6	12.6	12.4	12.5	12.5								
Conductivity (mS/cm)	3.32 ~~1.8320~~	3.32	3.47	3.92	4.86								
Dissolved Oxygen (mg/l)	.61	.10	.37	.08	.08								
ORP (mV)	-133.0	-181.3	-193.5	-200.1	-204.7								
Turbidity (NTU)	16.1	15.1	7.15	4.96	2.33								
Notes: time	0 mins	18 mins	39 mins	53 mins									

Sampling Information

Analyses	#	Laboratory
TCL VOC	3	Buffalo-Test America
TCL SVOC	2	Buffalo-Test America
TAL Metals	1	Buffalo-Test America
Total Cn	1	Buffalo-Test America
~~Free Cn~~ Total Cn	1	Buffalo-Test America
Sample ID: AW-02	Sample Time: 11:35	
MS/MSD:	(Yes) No	
Duplicate:	(Yes) No	
Duplicate ID	Dup. Time:	
Chain of Custody Signed By:		

Problems / Observations

Initial Purge: Sample Time 11:35

Final Purge:

Notes: Strong Sulfur Odor from Purge Water. Purge Water was black No Sheen.

GROUNDWATER SAMPLING LOG

Site: Wilkeson Slip | ***National Fuel Buffalo, NY*** | ***Event:*** *August 2013 GW Sampling*

Sampling Personnel:	Jeff Brayer, Andrew Fleming	**Well ID:**	AW-03
Client / Job Number:	Nat Fuel/ B0023310.0000	**Date:**	8/27/13
Weather:	Overcast, 70's	**Time In:** 2:20	**Time Out:** 15:15

Well Information

Depth to Water:	6.55	(feet TIC)
Total Depth:	18.25	(feet TIC)
Length of Water Column:	11.70	(feet)
Volume of Water in Well:	1.91	(gal)
Screen Interval:	10'	(feet)
Depth to pump Intake:	—	(feet TIC)

Well Type:	(Flushmount)	Stick-Up	
Well Material:	Stainless Steel	(PVC)	
Well Locked:	(Yes)	No	
Measuring Point Marked:	(Yes)	No	
Well Diameter:	1"	(2")	Other:

Purging Information

Purging Method:	Bailer	(Peristaltic)	Bladder	Other:
Tubing/Bailer Material:	St. Steel	(Polyethylene)	Teflon	Other:
Sampling Method:	(Bailer)	(Peristaltic)	Bladder	Other:
Duration of Pumping:	60 (min)			
Average Pumping Rate:	450 (ml/min)	Water-Quality Meter Type:	(YSI) Lamotte 2020	
Total Volume Removed:	7.10 (gal)	Did well go dry:	Yes	(No)

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3785 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter:	1	2 1V	3 2V	4 3V	5	6	7	8	9	10	11	12	13
Volume Purged (gal)	0	1.90	4.10	7.10									
Rate (mL/min)	400	450	450	450									
Depth to Water (ft.)	6.55	6.55	6.55	6.55									
pH	6.96	6.72	6.68	6.68									
Temp. (C)	17.3	16.0	16.1	15.9									
Conductivity (mS/cm)	2.80	2.75	2.76	2.76									
Dissolved Oxygen (mg/l)	0.50	.07	.16	.07									
ORP (mV)	-80.3	-118.6	-122.3	-127.3									
Turbidity (NTU)	17.7	7.45	4.72	3.57									
Notes: time	2.20	2.42	3:00	3.16									

Sampling Information

Analyses	#	Laboratory
TCL VOC	3	Buffalo-Test America
TCL SVOC	2	Buffalo-Test America
TAL Metals	1	Buffalo-Test America
Total Cn	1	Buffalo-Test America
~~Free Cn~~ Total Cn	1	Buffalo-Test America
Sample ID: AW-03	Sample Time: 15:15	
MS/MSD: Yes	(No)	
Duplicate: (Yes)	No	
Duplicate ID FD-01-082713	Dup. Time: 15:15	
Chain of Custody Signed By:		

Problems / Observations

Initial Purge: Sample Time! 15:15

Final Purge:

Notes: Field Dup: FD-01-082713

GROUNDWATER SAMPLING LOG

Site: Wilkeson Slip | ***National Fuel Buffalo, NY*** | ***Event:*** *August 2013 GW Sampling*

Sampling Personnel:	Jeff Brayer, Andrew Fleming	**Well ID:**	AW-04
Client / Job Number:	Nat Fuel/ B0023310.0000	**Date:**	8/27/13
Weather:	Overcast, 70's	**Time In:** 15:50	**Time Out:** 16:50

Well Information

Depth to Water:	9.57	(feet TIC)
Total Depth:	21.40	(feet TIC)
Length of Water Column:	11.83	(feet)
Volume of Water in Well:	1.93	(gal)
Screen Interval:	10'	(feet)
Depth to pump Intake:	—	(feet TIC)

Well Type:	(Flushmount)			Stick-Up
Well Material:	Stainless Steel		(PVC)	
Well Locked:	(Yes)			No
Measuring Point Marked:	(Yes)			No
Well Diameter:	1"	(2")		Other:

Purging Information

Purging Method:	Bailer	(Peristaltic)	Bladder	Other:
Tubing/Bailer Material:	St. Steel	(Polyethylene)	Teflon	Other:
Sampling Method:	(Bailer)	(Peristaltic)	Bladder	Other:

Duration of Pumping: 60 (min)

Average Pumping Rate: 500 (ml/min) Water-Quality Meter Type: (YSI) Lamotte 2020

Total Volume Removed: (gal) Did well go dry: Yes (No)

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3785 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter:	1	2 1V	3 2V	4 3V	5	6	7	8	9	10	11	12	13
Volume Purged (gal)	0	1.9	3.8	5.8									
Rate (mL/min) 500	499.8	500	500	500									
Depth to Water (ft.)	9.57	10.95	11.07	10.65									
pH	6.72	6.69	6.70	6.69									
Temp. (C)	15.6	15.3	15.1	15.2									
Conductivity (mS/cm)	5.70	5.31	5.29	5.24									
Dissolved Oxygen (mg/l)	.20	.10	.07	.07									
ORP (mV)	-105.7	-119.5	+127.5	+132.1									
Turbidity (NTU)	2.50	4.91	3.96	2.85									
Notes:													

Sampling Information

Analyses	#	Laboratory
TCL VOC	3	Buffalo-Test America
TCL SVOC	2	Buffalo-Test America
TAL Metals	1	Buffalo-Test America
Total Cn	1	Buffalo-Test America
~~Free Cn~~ Total Cn	1	Buffalo-Test America
Sample ID: ~~Total Cn~~		Sample Time: AW-04
MS/MSD:	Yes	(No)
Duplicate:	Yes	(No)
Duplicate ID		Dup. Time:
Chain of Custody Signed By:		

Problems / Observations

Initial Purge: Sample time = 16:40

Final Purge:

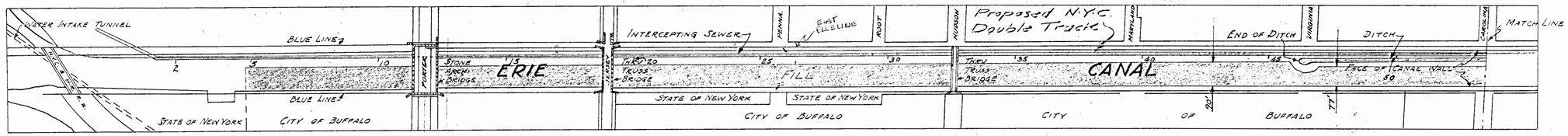
Notes: Solid tone on interface probe
- No Sheen observed on purge water
- Organic odor - Non-petroleum like

ARCADIS

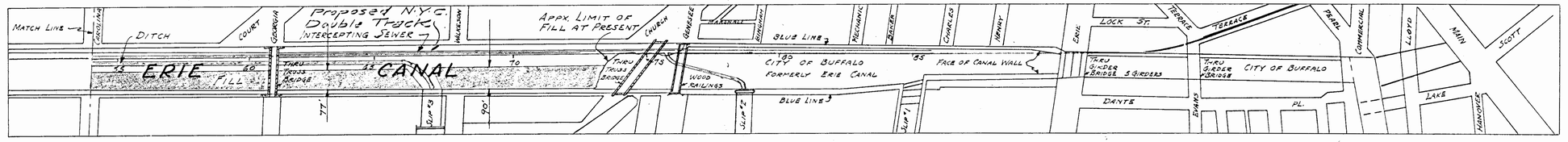
Appendix E

Design Drawings for the Buffalo Sewer Authority South Interceptor

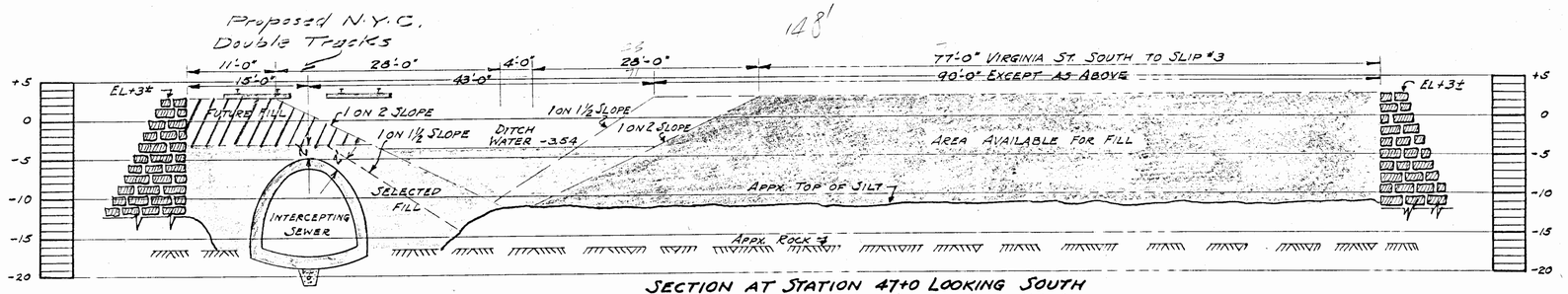
Buffalo Sewer Authority Intercepting Sewer, Division H, Canal Section (April 1936)



PLAN
SCALE 1" = 200'



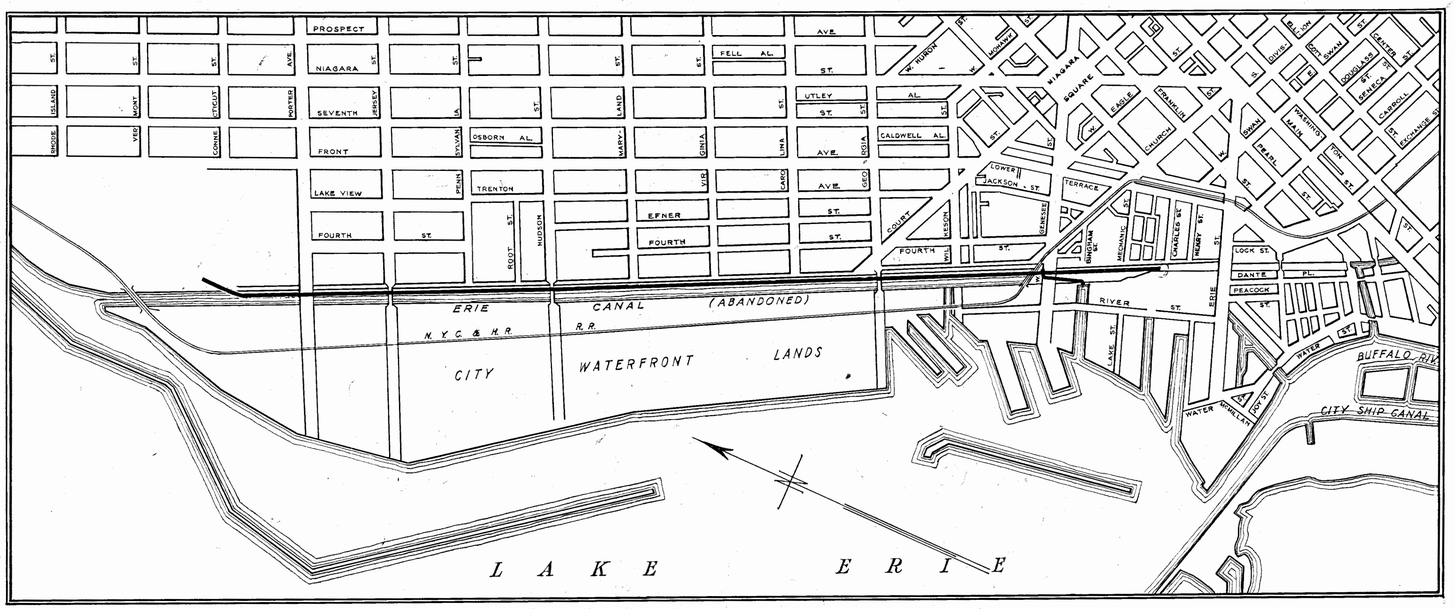
PLAN
SCALE 1" = 200'



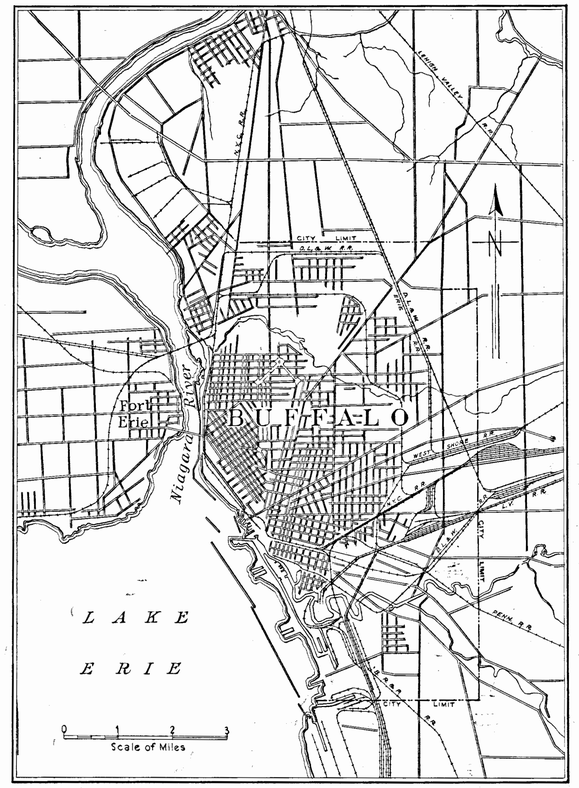
SECTION AT STATION 47+0 LOOKING SOUTH
(SOUTH OF VIRGINIA ST.) SCALE 1/8"=1'-0"

BUFFALO SEWER AUTHORITY
PLAN OF PROPOSED CITY DUMP IN OLD ERIE CANAL BED FROM FRONT TO GENESEE ST.

GREELEY & HANSEN — JAN 15, 1937
SCALE NOTED
DIVISION H



GENERAL PLAN



LOCATION MAP

INTERCEPTING SEWER
DIVISION H — CANAL SECTION
LIST OF PLANS

Sheet	Title
1	Location Maps and List of Plans
2	Index Map
3	Plan & Profile - Sta. 0+00 to Porter Avenue
4	" " Porter Ave. to Pennsylvania St.
5	" " Pennsylvania St. to Maryland St.
6	" " Maryland St. to Carolina St.
7	" " Carolina St. to Wilkeson St.
8	" " Wilkeson St. to Mechanic St.
9	" " Mechanic St. to Charles St. and Miscellaneous Details
10	Sewer Crossings - Virginia St. and Charles St.
11	Sewer Crossing - Genesee St.
12	Storm Drain Outlets - Virginia St. and Charles St.
13	Sewer Sections and Details
14	Manholes and Details

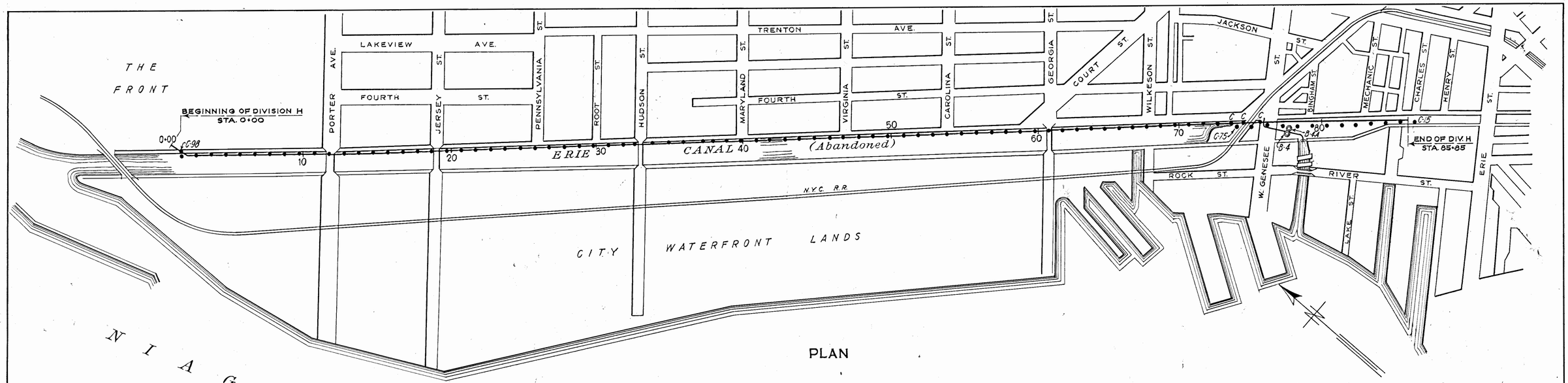
NOTE

Elevations are referred to Buffalo City Datum. Buffalo City Datum is 575.89 feet above mean tide at New York by the level adjustment of 1903, used by U. S. Engineers, and is 577.0 feet above datum of N.Y. State Canal Surveys of 1900 and 1901.

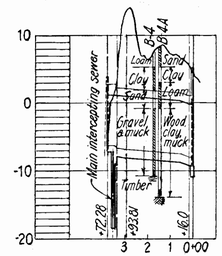
APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF APRIL 21 1936
Harold Eaton
PROJECT ENGINEER DOCKET N.Y. 1034-R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF April 20th, 1936
GREELEY AND HANSEN, ENGINEERS
BY Paul Hansen
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF June 20, 1936

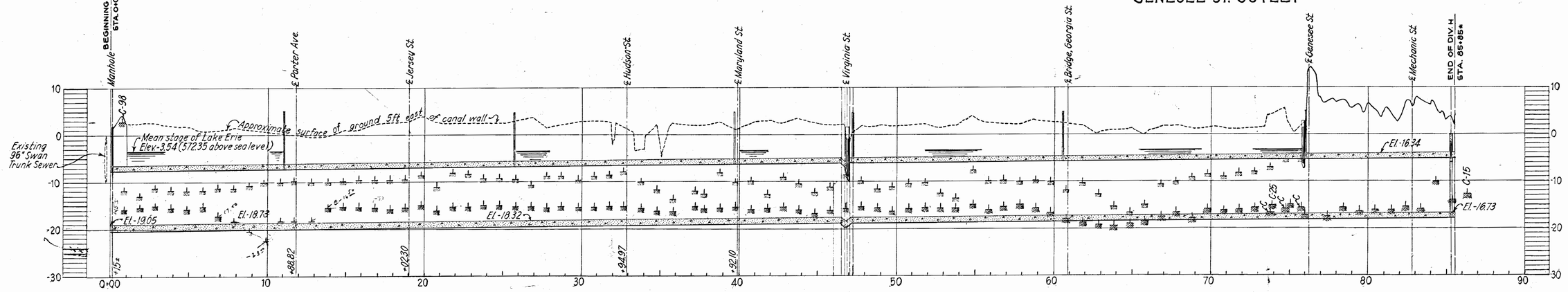
BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION
LOCATION MAPS AND LIST OF PLANS
APRIL, 1936
14 SHEETS. No.



PLAN



GENESEE ST. OUTLET



PROFILE

LEGEND

- ● Rod Sounding
- ◎ 6" Cased Boring
- Top of Rock
- Top of Silt in Canal bed
- ⊥ Bottom of sounding; no rock encountered

THIS SHEET IS NOT A PART OF THE CONTRACT

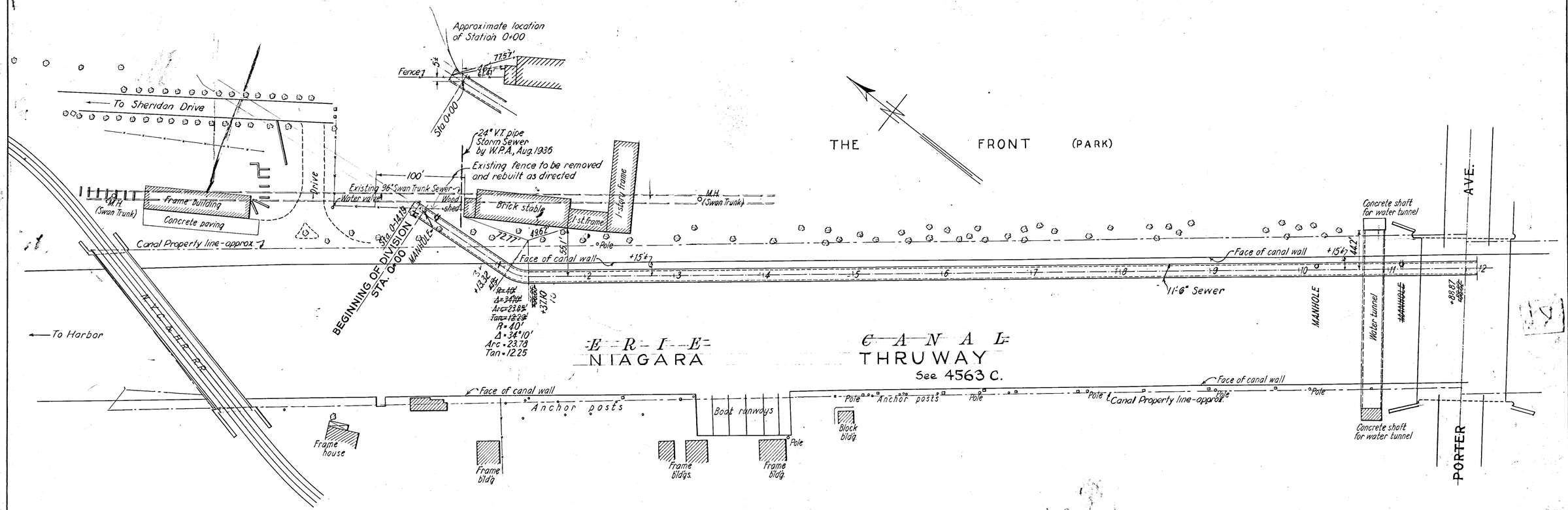
Records from which this sheet is prepared are on file and available for inspection at the office of the Authority, Room 427, City Hall, Buffalo, N.Y. The information shown hereon is furnished to Contractors for their convenience only, without expressed or implied guarantee as to its being complete or correct.

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY

INTERCEPTING SEWER
DIVISION H
CANAL SECTION
PLAN AND PROFILE
SHOWING RESULTS OF
BORINGS AND SOUNDINGS

1936

SHEETS No. 2



APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY
ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF _____ 1936
_____
PROJECT ENGINEER, DOCKET N.Y. 1034-R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF _____ 1936
GREELEY AND HANSEN, ENGINEERS
BY _____
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF _____ 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY

INTERCEPTING SEWER
DIVISION H
CANAL SECTION

PLAN AND PROFILE
STA. 0+00 TO PORTER AVE.

APRIL, 1936 RECORD DRAWING 14 SHEETS No. 3

PORTER AVE.

THIRD ST.

JERSEY ST.

PENNSYLVANIA ST.

Stone Bldg.

Ramp

Ramp

8" conc. post

Tanks

4-story brick

2-story brick

Tank

Tanks

24" poplar

E.R.B. Office 1-story frame

Shack

Hoist

Guard rail

Canal Property line - approx.

1½" iron pipe

Face of canal wall

15'±

6.9'

3" pipe

3" pipe

5" pipe

4" C.I. pipe

4" C.I. pipes

6.9'

Face of canal wall

15'±

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

24" V.T. CONNECTION See detail, this sheet

11'-6" Sewer

MANHOLE

+96.83

10'-2" water tunnel

4" gas on bridge

+01.67

12" water on bridge

ERIE NIAGARA

CANAL THRUWAY

See S4563 A&B

Face of canal wall

Pole

Pole

Pole

4" pipe

Shacks

Face of canal wall

Canal Property line - approx.

PLAN

0 50 100 150 Ft.

24" V.T. sewer

El.-14.0

Sta. 16+83

Inv. El.-18.60

11'-6" Intercepting Sewer El.-14.0

El.-18.60

ELEVATION

SECTION

24" CONNECTION AT STA. 16+83.

0 5 10 15 Ft.

Elevation

10 0 -10 -20 -30

Mean Stage - See Sh. #3

24" V.T. CONNECTION (West side)

℄ Jersey St.

Approx. ground surface 5' East of Face of Canal Wall

El. +4.94

MANHOLE

Elev. +5.47

℄ Pennsylvania St.

HEAVY EARTH SECTION

Elev. -18.73

Original rock surface on ℄ of sewer

℄ El.-14.00

11'-6" S.E.W.E.R.

S-l-o-p-e 0.27 feet per 1000 feet

Original rock surface on ℄ of pipe

Elev. -18.32

+25±

+83

+01.67

+29.6

+25±

+96.83

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

PROFILE

Water tunnel

60" C.I. pipe

20" steel, high pressure

Elev. -52±

APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY
ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF _____ 1936

PROJECT ENGINEER, DOCKET N.Y. 1034-R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF _____ 1936

GREELEY AND HANSEN, ENGINEERS

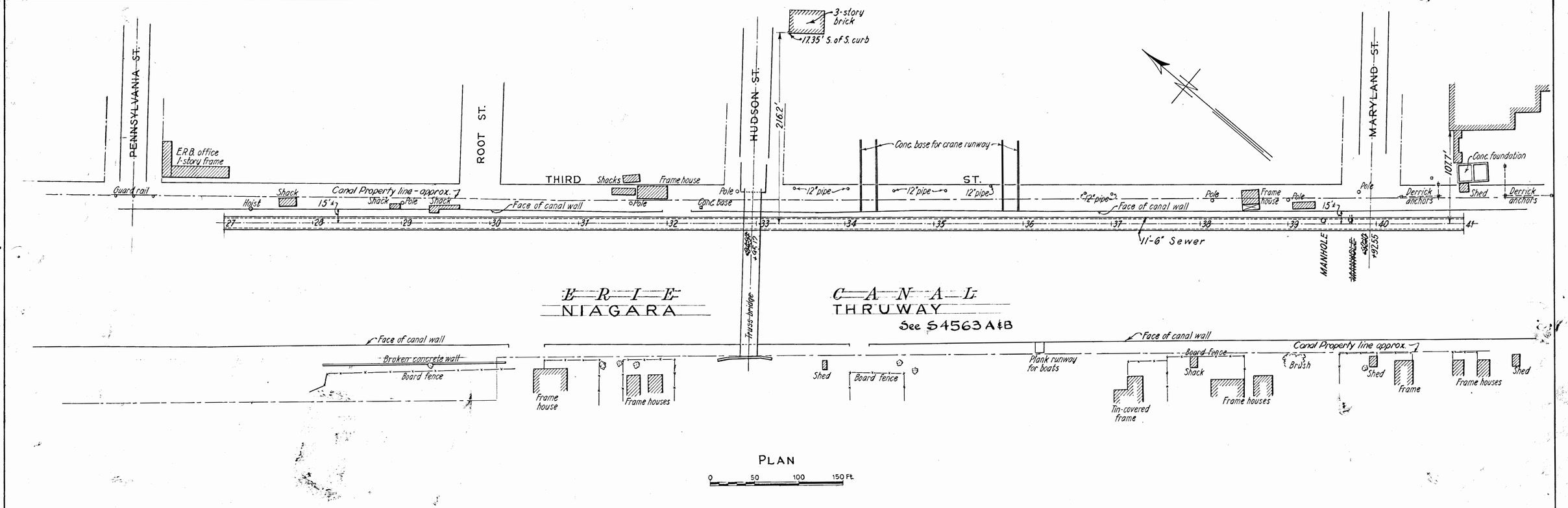
BY _____
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF _____ 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY

INTERCEPTING SEWER
DIVISION H
CANAL SECTION

PLAN AND PROFILE
PORTER AVE. to PENNSYLVANIA ST.

APRIL, 1936 RECORD DRAWING 14 SHEETS, No. 4



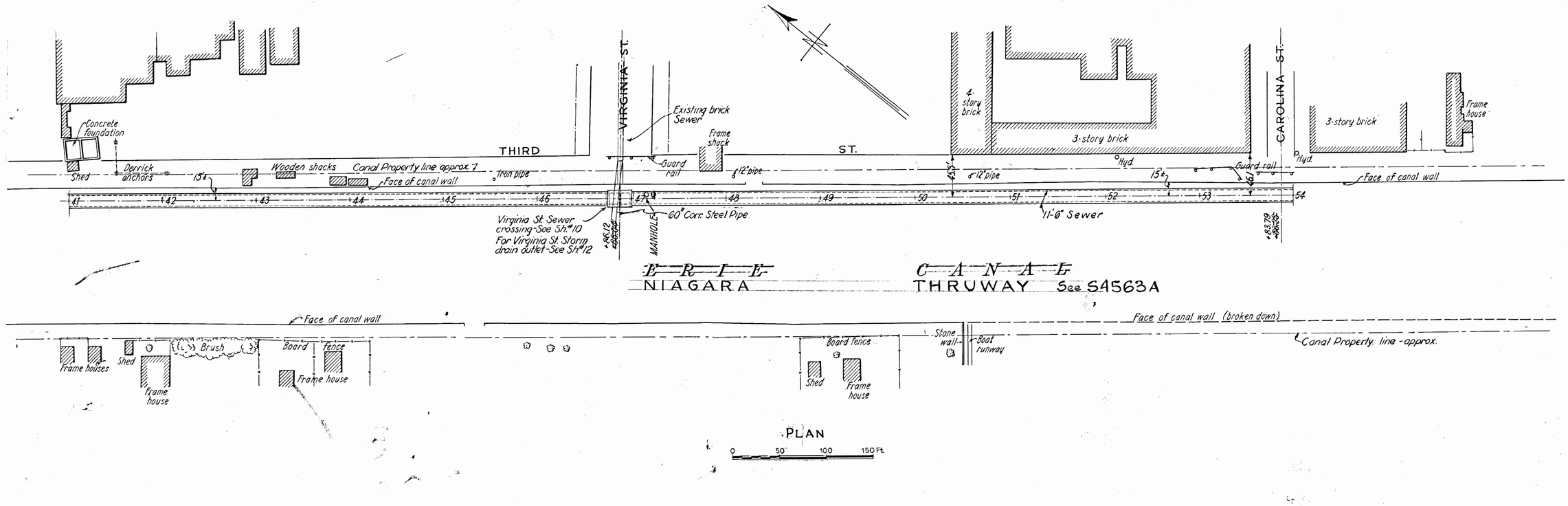
APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY
ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF _____ 1936
PROJECT ENGINEER, DOCKET N.Y. 1034 R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

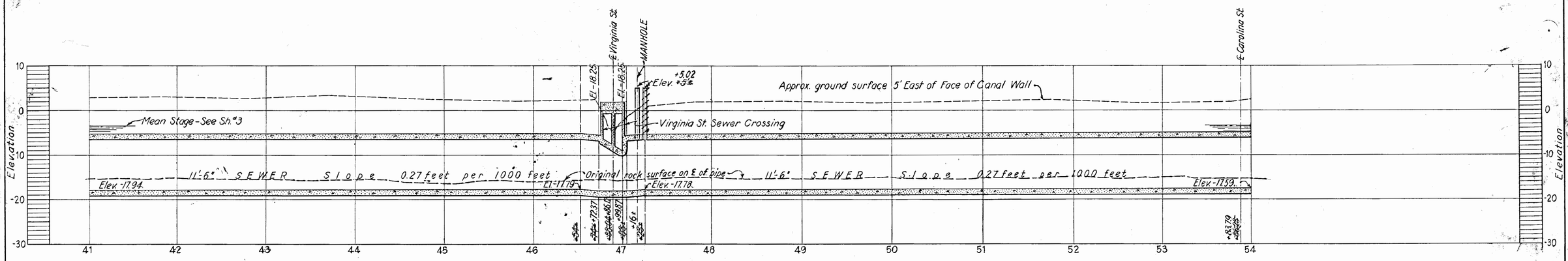
APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF _____ 1936
GREELEY AND HANSEN, ENGINEERS
BY _____
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF _____ 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION

PLAN AND PROFILE
PENNSYLVANIA ST. to MARYLAND ST.

APRIL, 1936 RECORD DRAWING 14 SHEETS No. 5





PROFILE

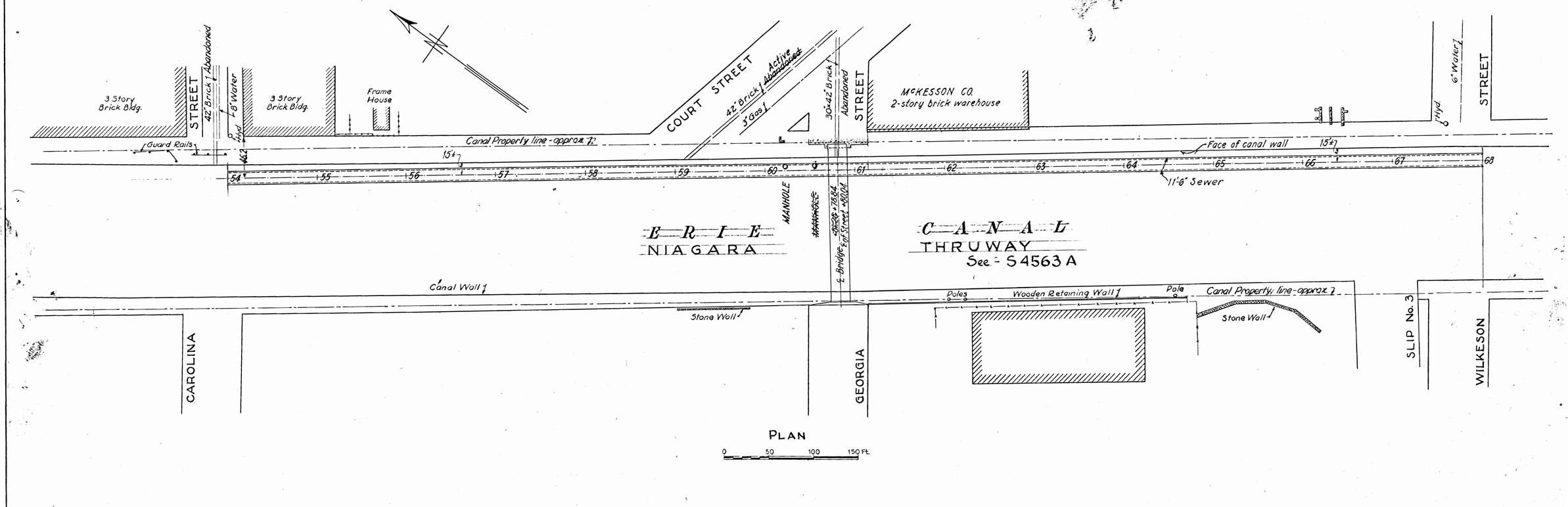
APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY
ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF _____ 1936
PROJECT ENGINEER, DOCKET N.Y. 1034-R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF _____ 1936
GREELEY AND HANSEN ENGINEERS
BY
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF _____ 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION

PLAN AND PROFILE
MARYLAND ST. to CAROLINA ST.

APRIL, 1936 RECORD DRAWING 14 SHEETS, No. 6



APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY
ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF _____ 1936
PROJECT ENGINEER, DOCKET N.Y. 1034-R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF _____ 1936
GREELEY AND HANSEN, ENGINEERS
BY _____
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF _____ 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION

PLAN AND PROFILE
CAROLINA ST. to WILKESON ST.

APRIL, 1936 RECORD DRAWING 14 SHEETS No. 7

E R I E C A N A L

NIAGARA THRUWAY

See S4563

WILKESON STREET

3RD. ST.

CHURCH ST.

GENESEE ST.

BINGHAM ST.

MECHANIC ST.

Shed · Shop · Garage · Office · Drive

3 Story Brick · 1 Story Tin · 2 Story Frame · 1 Story Frame

Canal Property line - approx.

Face of Canal Wall

Old bridge abutment

MANHOLE

Existing 6'0" sewer

12" V.T. connection, see detail

Approximate limit of fill

Beginning of Item H-3

GENESEE ST. CROSSING, ITEM H5

For details see Sheet No. 11

GENESEE ST. OUTLET SEWER ITEM H3

R=40' Δ=12°41'43.45" Arc=9.52 Tan=4.78 0.50 0.25

R=30' Δ=77°20' Arc=40.47 Tan=24.00

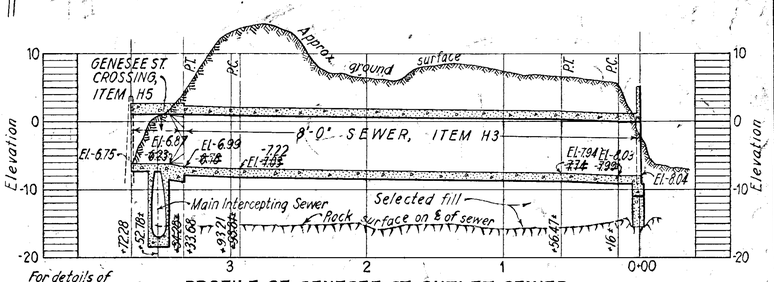
Retaining wall · Ramp · HEADWALL Incl. in Item H3 For details see Sheet No. 9

Break in wall · Pole · Gas Pump · Sign · Brick Pillars · Tanks · Brick Office · Poles · Stone Abut · 2 Story Brick · 3 Story Brick · 1 Story Brick · Stone wall · Slip No. 2 · Shacks · 1 Story Frame

Canal Property line - approx.

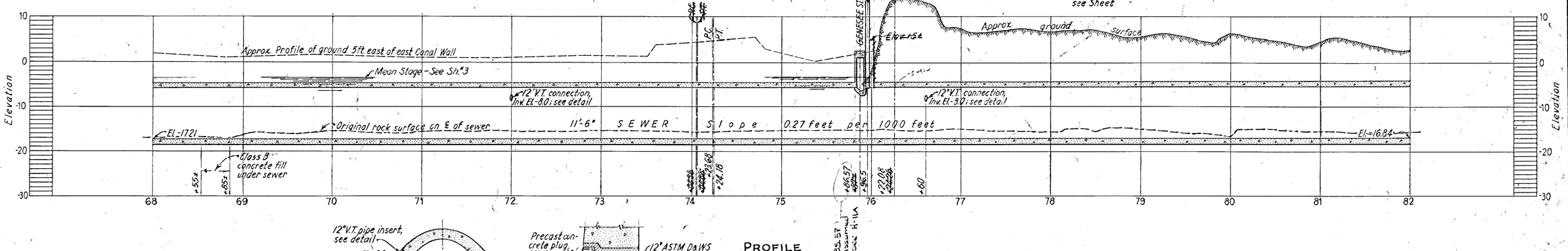
PLAN

0 50 100 150 Ft.

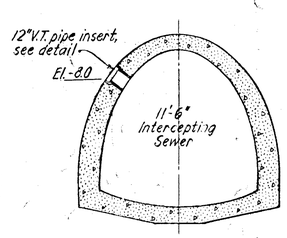


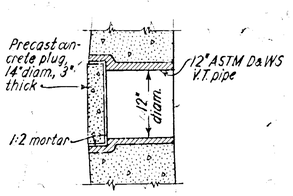
For details of Genesee St. Crossing see Sheet

PROFILE OF GENESEE ST. OUTLET SEWER



PROFILE





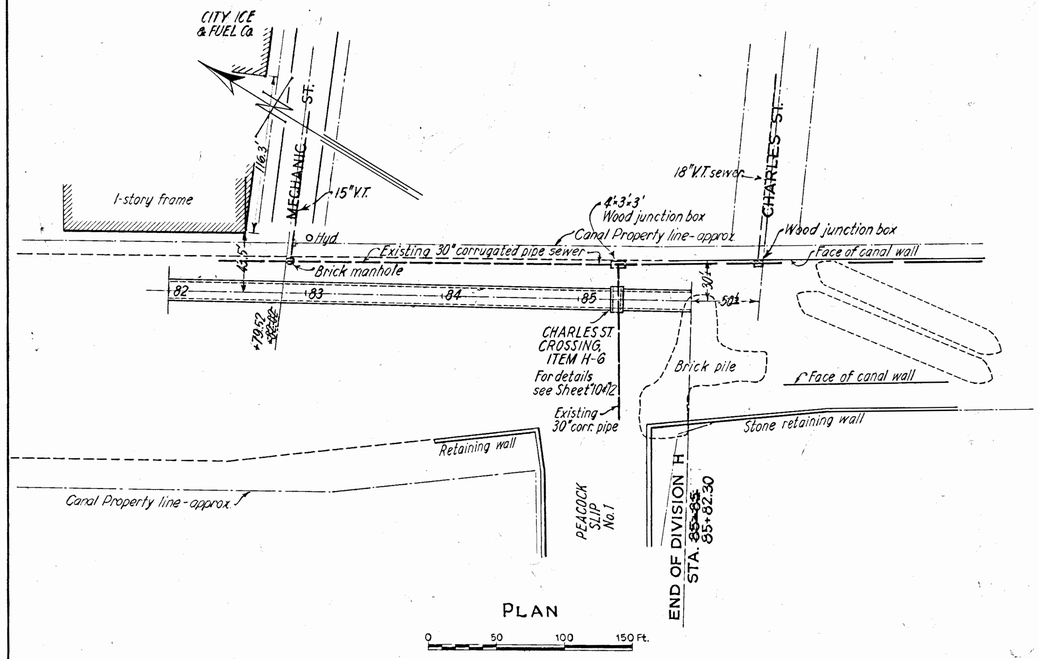
DETAIL OF 12" CONNECTION STA. 72+00 AND STA. 76+60

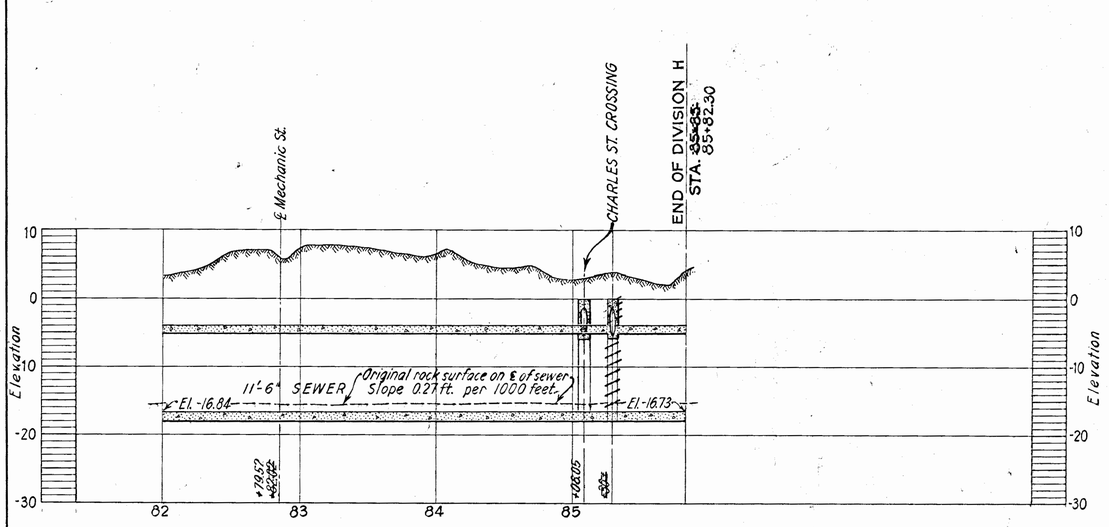
APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF _____ 1936
PROJECT ENGINEER, DOCKET N.Y. 1034-R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

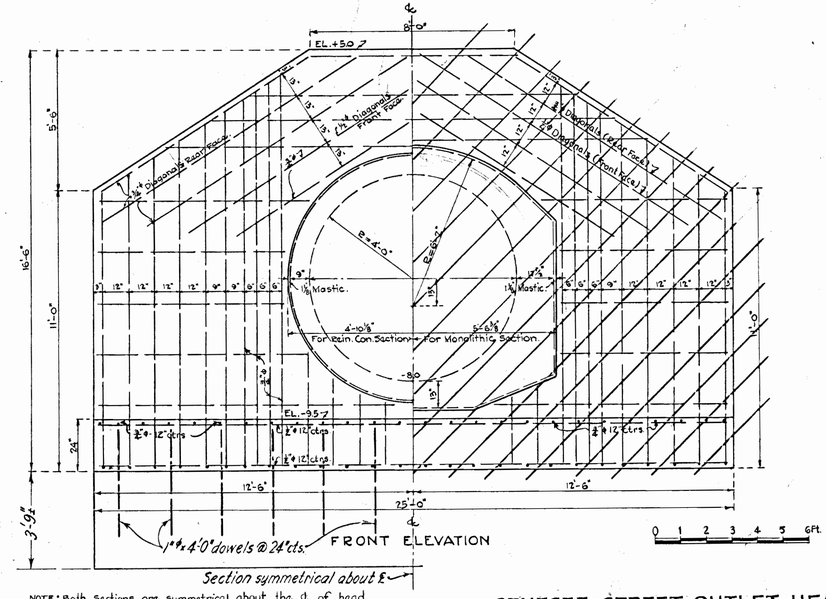
APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF _____ 1936
GREELEY AND HANSEN, ENGINEERS
BY _____
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF _____ 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION
PLAN AND PROFILE
WILKESON ST. to MECHANIC ST.

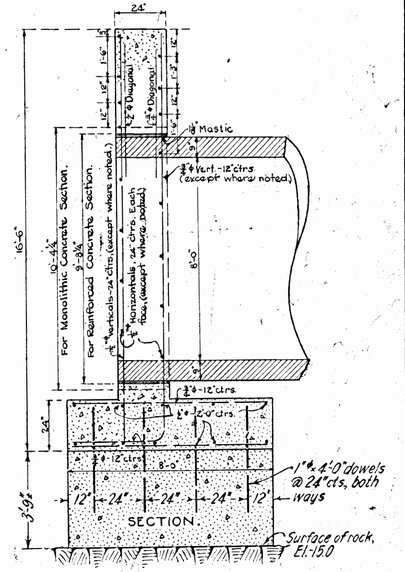
APRIL, 1936 RECORD DRAWING 14 SHEETS. No. 8



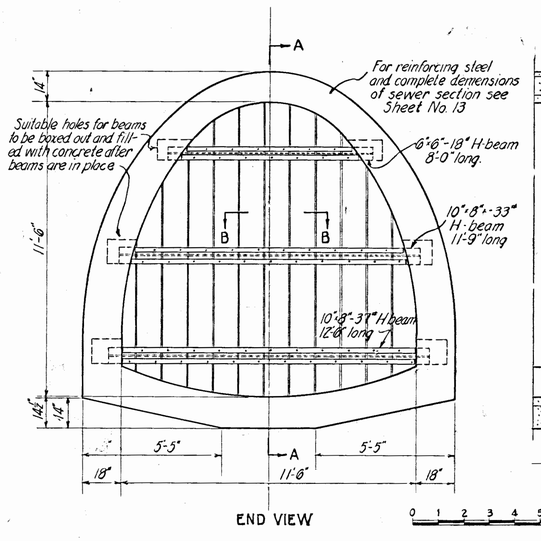


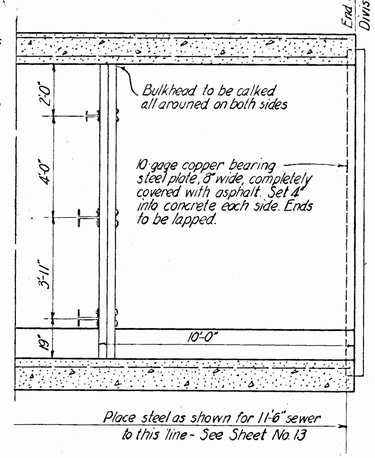


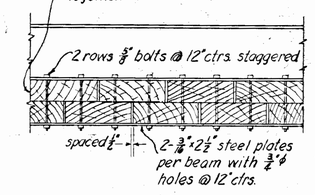
NOTE: Both Sections are symmetrical about the ℄ of head wall, consequently, details of opening in wall and arrangement of reinforcing steel depend upon section used.



GENESEE STREET OUTLET HEADWALL







SECTION B-B.

0 1 2 3 4Ft.

DETAILS OF TERMINAL BULKHEAD

2 REQUIRED

APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY
ADMINISTRATION OF PUBLIC WORKS

UNDER DATE OF _____ 1936

PROJECT ENGINEER, DOCKET N.Y. 1034 R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY

UNDER DATE OF _____ 1936

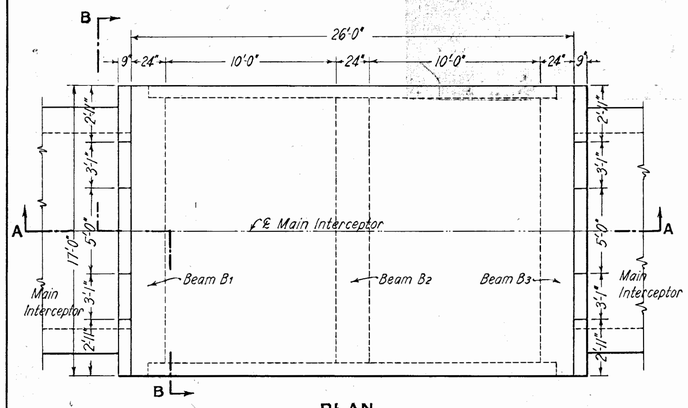
GREELEY AND HANSEN, ENGINEERS

BY _____
LICENSED PROFESSIONAL ENGINEER

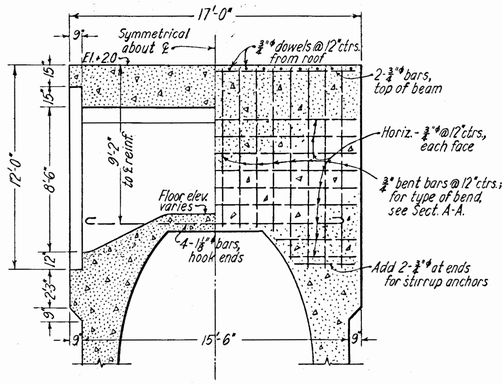
UNDER DATE OF _____ 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION
PLAN AND PROFILE
MECHANIC ST. to CHARLES ST.
MISCELLANEOUS DETAILS

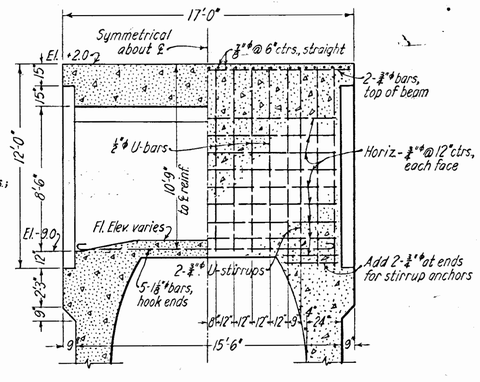
APRIL, 1936 RECORD DRAWING 14 SHEETS No. 9



PLAN



BEAM B1



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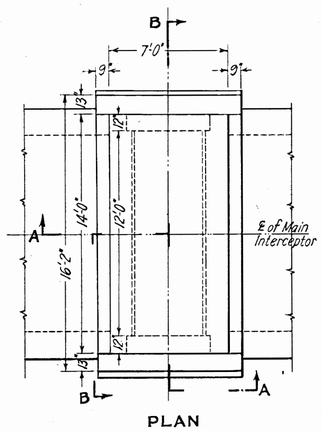
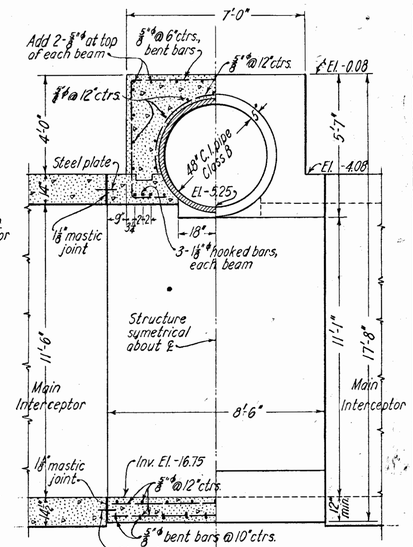
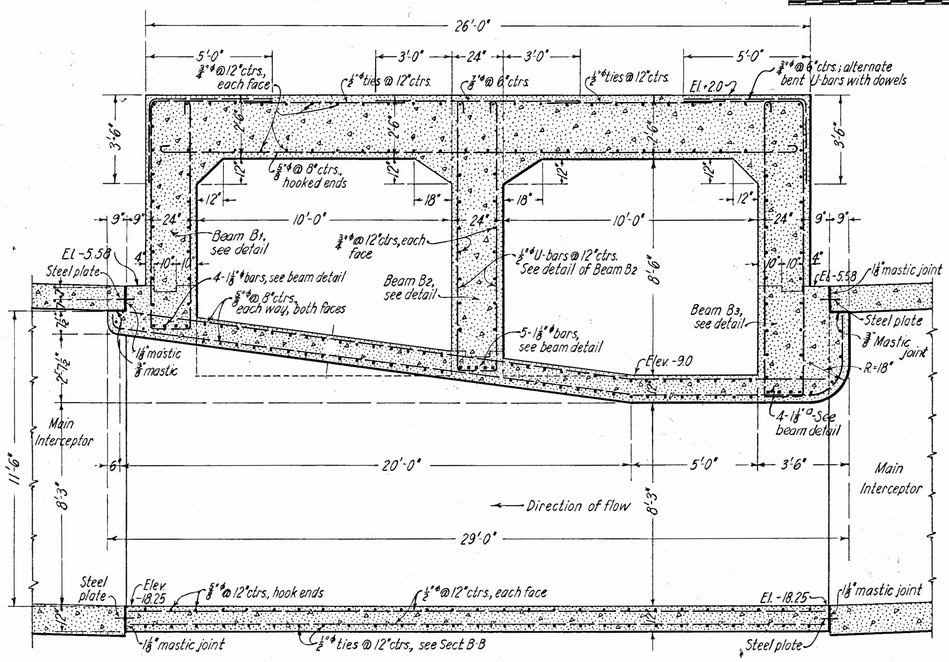


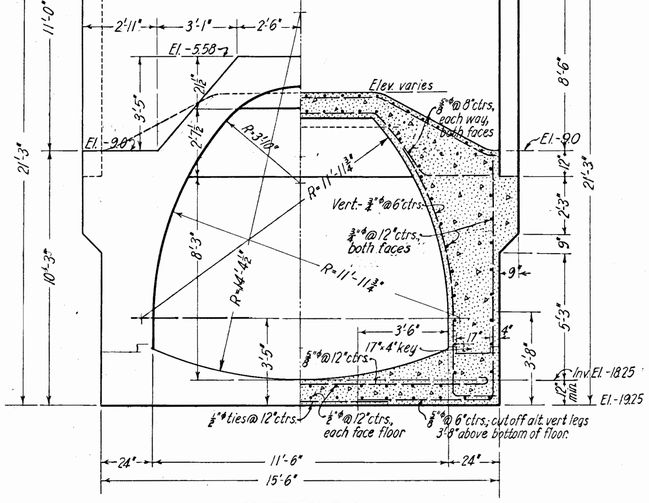
PLAN



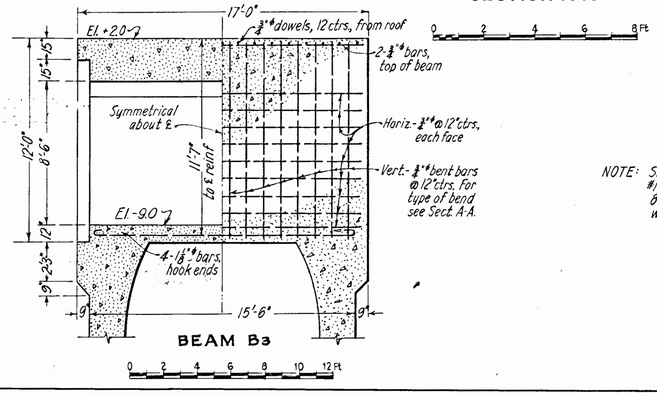
SECTION A-A



SECTION A-A



SECTION B-B



BEAM B3

SECTION B-B

VIRGINIA STREET CROSSING

NOTE: Steel plates at joints shall be #10 gage copper-bearing steel, 8" wide, completely covered with asphalt before placing.

CHARLES STREET CROSSING

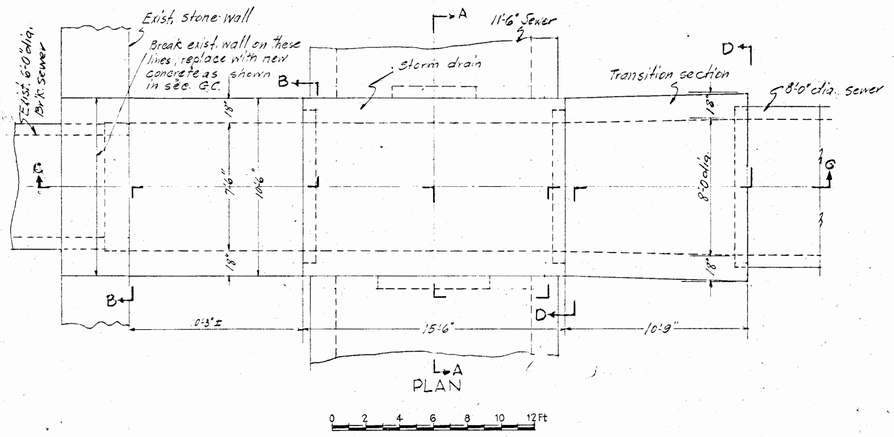
APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY
ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF _____ 1936

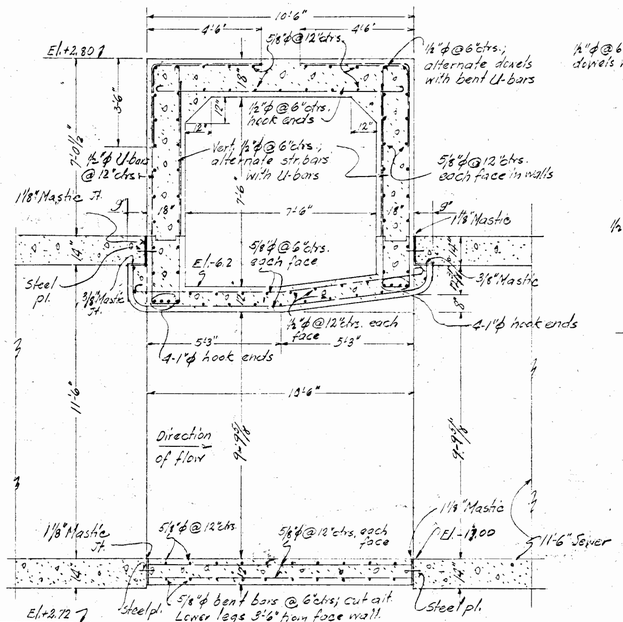
_____
PROJECT ENGINEER, DOCKET N.Y. 1034-R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF _____ 1936

GREELEY AND HANSEN, ENGINEERS
BY _____
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF _____ 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION
SEWER CROSSINGS
VIRGINIA STREET
AND
CHARLES STREET
APRIL, 1936 RECORD DRAWING 14 SHEETS. No. 10

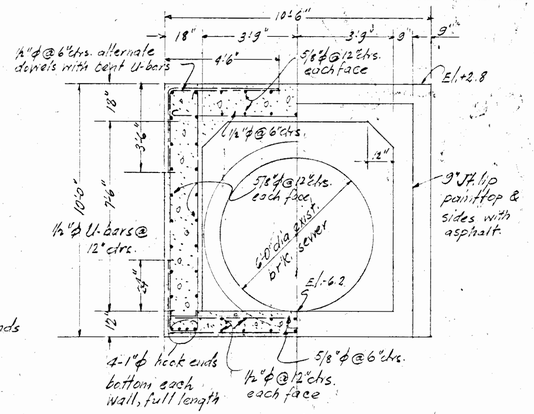




SECTION A-A

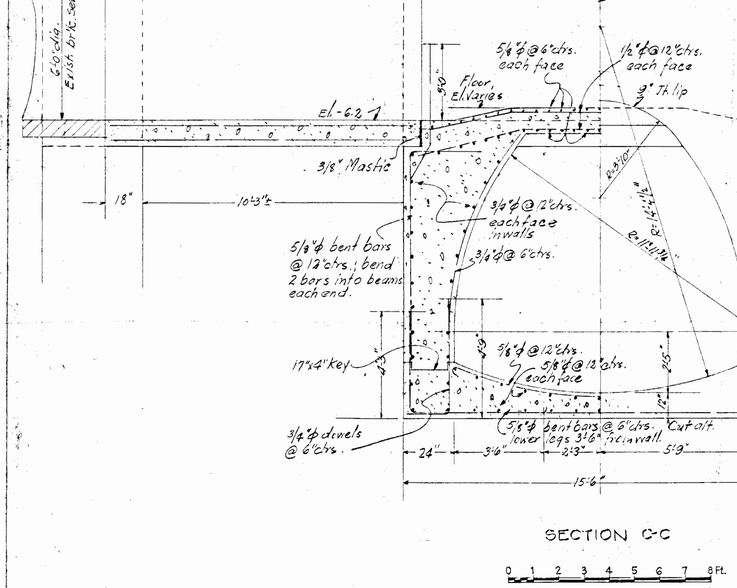
0 1 2 3 4 5 6 7 8 Ft.

Note:- Steel pls. at joints shall be #10 ga. copper bearing steel 8" wide completely covered with asphalt before placing.



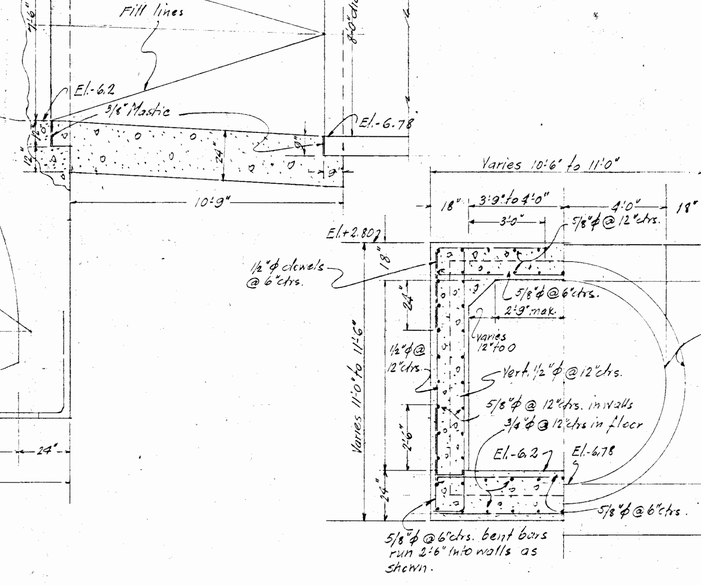
SECTION B-B

0 1 2 3 4 5 6 7 8 Ft



SECTION C-C

0 1 2 3 4 5 6 7 8 Ft.



SECTION D-D

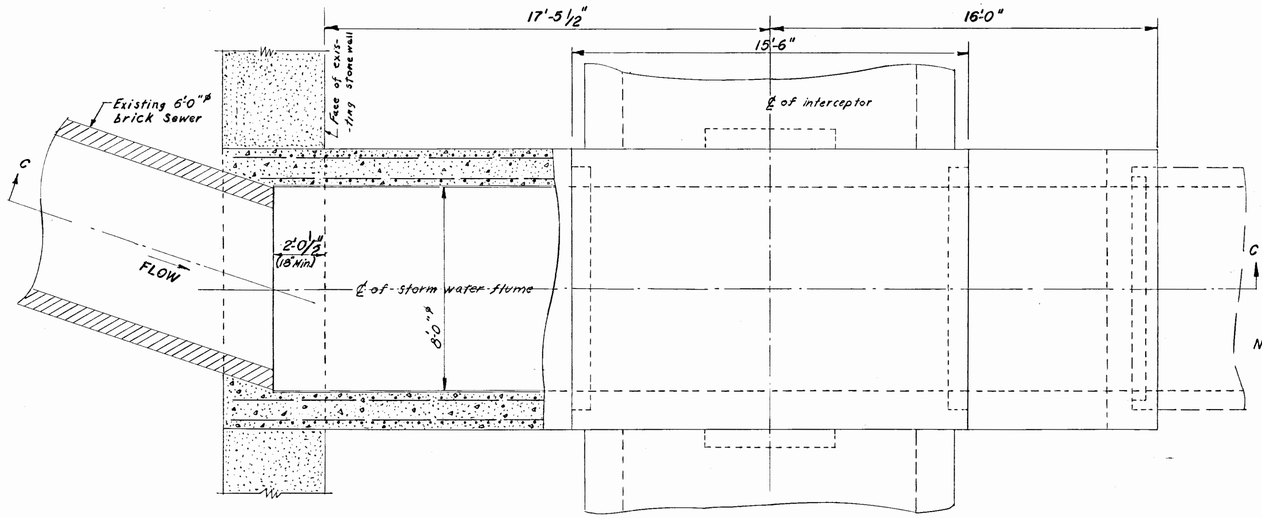
0 1 2 3 4 5 6 7 8 Ft.

This sheet supersedes Sheet 11a

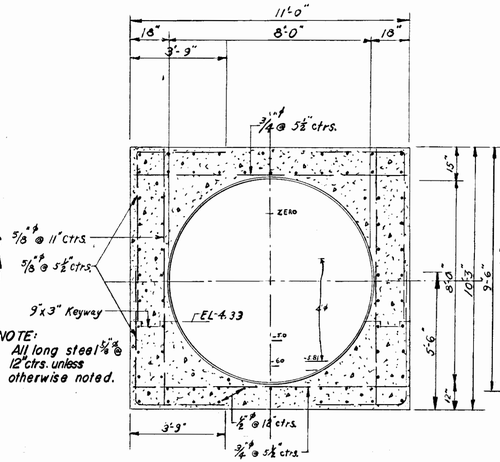
BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION
SEWER CROSSING
GENESEE STREET

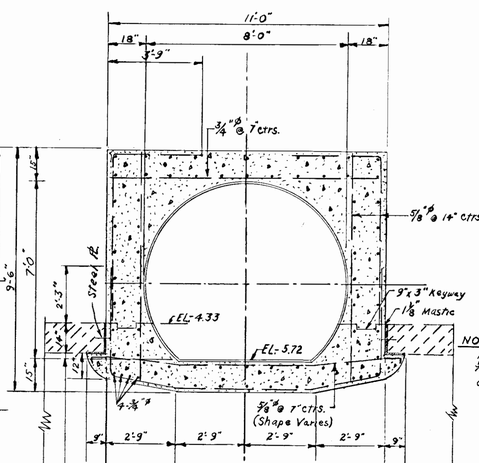
APRIL, 1936

14 SHEETS No. 11



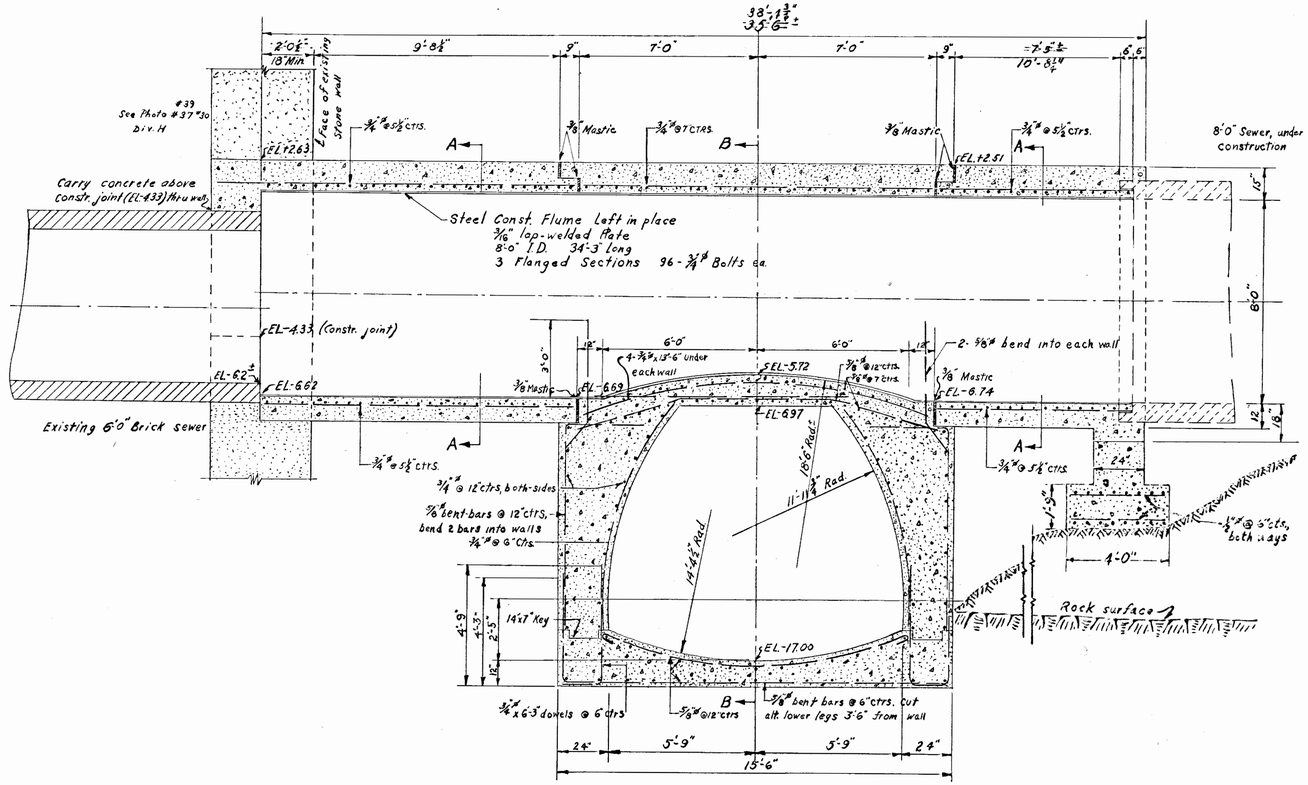
PLAN



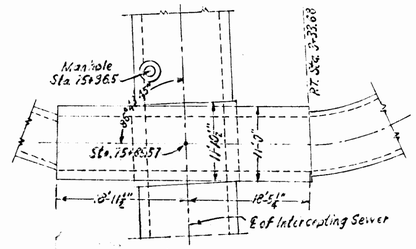


SECTION A-A

SECTION B-B



SECTION C-C



PLAN SHOWING RELATION OF CROSSING TO INTERCEPTING SEWER

Note :- This sheet supersedes Contract Sheet No. 11

APPROVED AS TO CONFORMITY WITH AGREEMENT BETWEEN THE APPLICANT AND THE UNITED STATES OF AMERICA

Harold Epstein
PROJECT ENGINEER - P.W.A.
PROJECT N.Y. 1034 R.

DATE March 31 1937

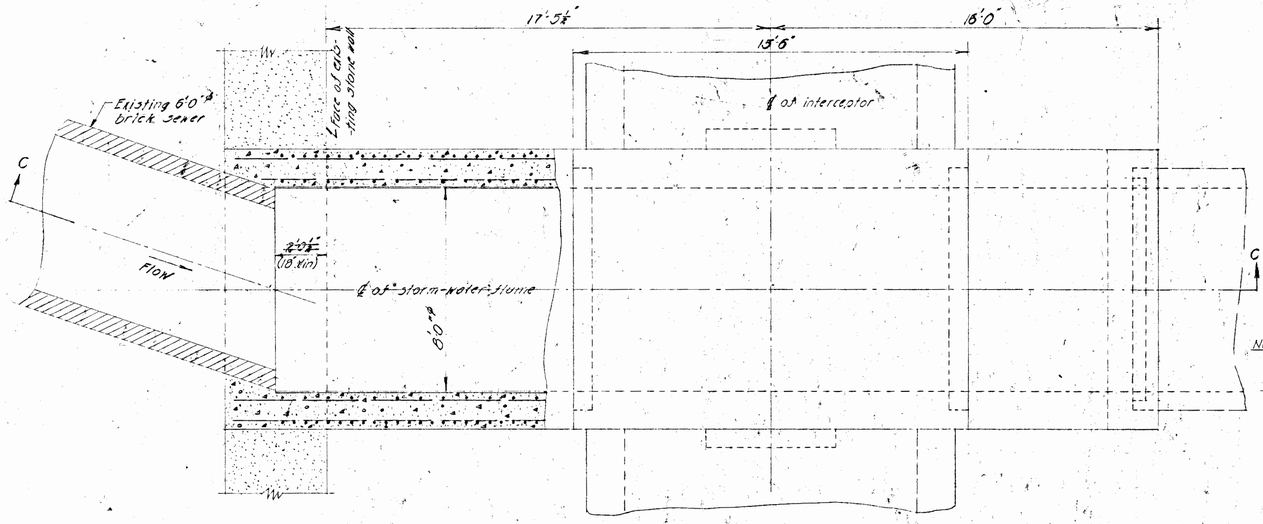
GREELEY AND HANSEN, ENGINEERS

BY C.R. Velz
RESIDENT ENGINEER

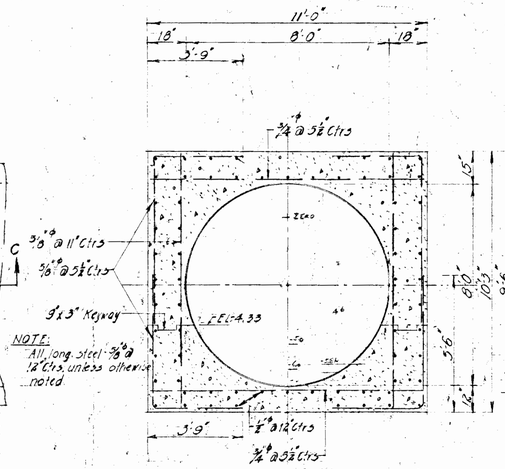
UNDER DATE OF Mar. 31, 1937

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION
SEWER CROSSING
GENESEE STREET
REVISED DESIGN

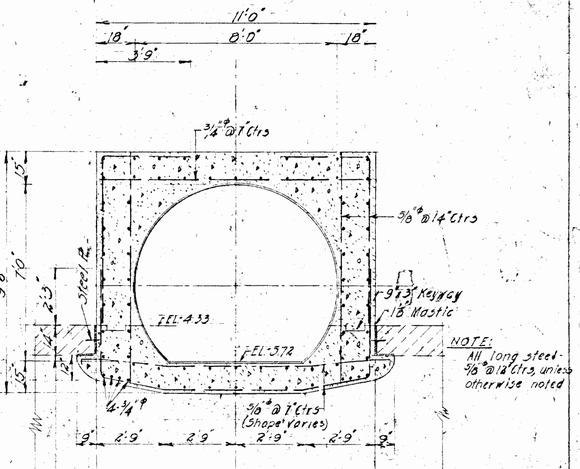
FEBRUARY 1937. SUPPLEMENTARY SHEET No. 11a.
RECORD DRAWING SHEET 11A



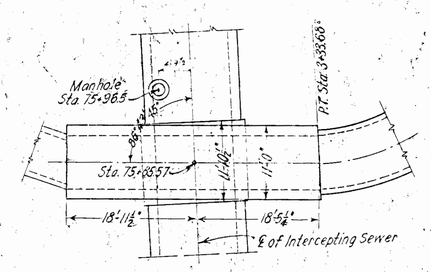
PLAN.



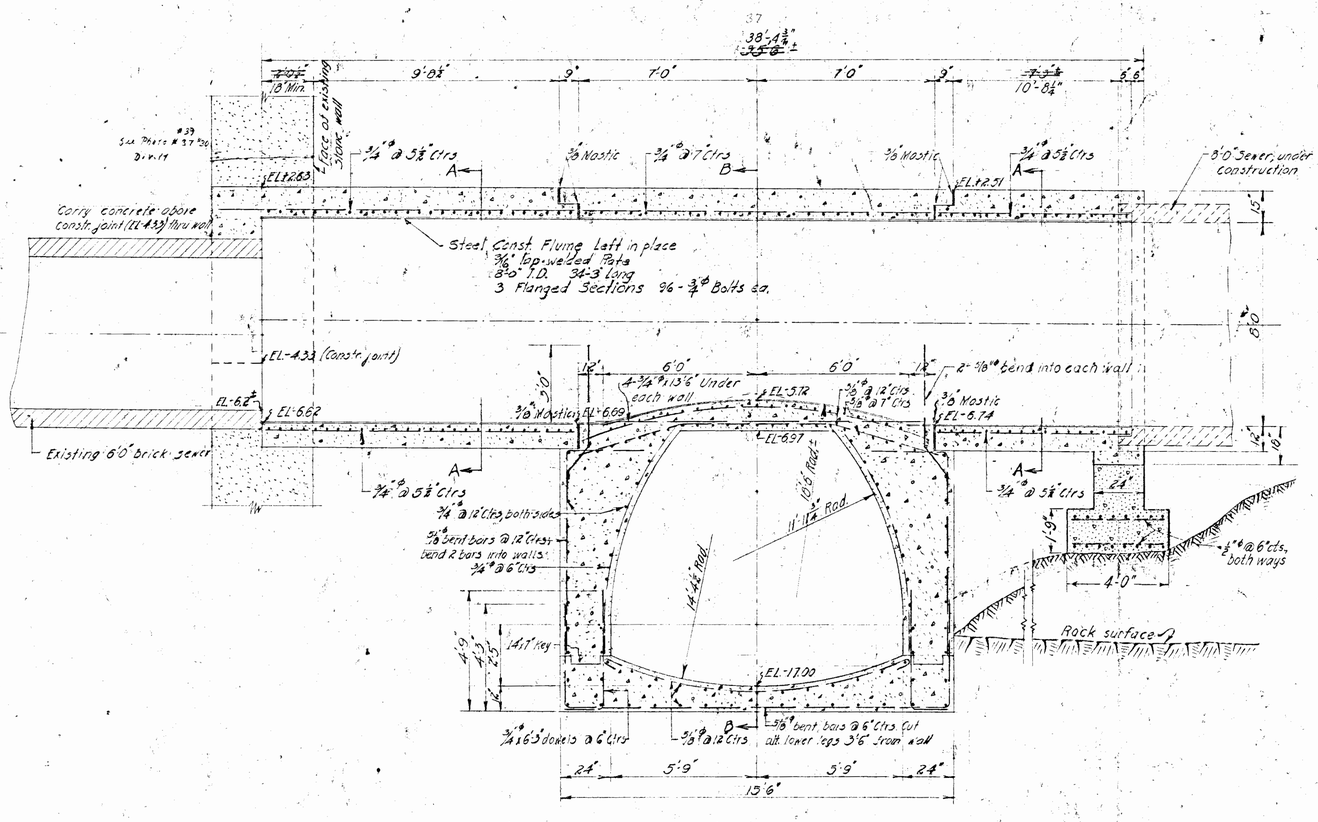
SECTION A-A



SECTION B-B



PLAN SHOWING RELATION
OF CROSSING TO INTERCEPTING SEWER



SECTION C-C

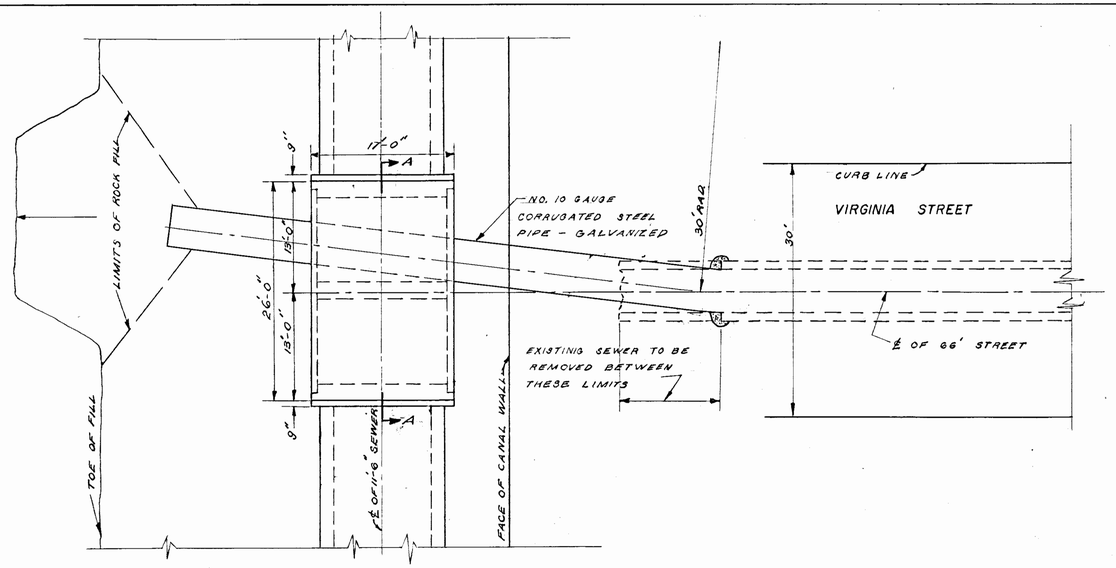
Note :- This sheet supersedes Contract Sheet No. 11

APPROVED, AS TO CONFORMITY WITH AGREEMENT BETWEEN THE APPLICANT AND THE UNITED STATES OF AMERICA
Harold Peterson
PROJECT ENGINEER - P.W.A.
PROJECT N.Y. 1034-R
DATE March 31 1937

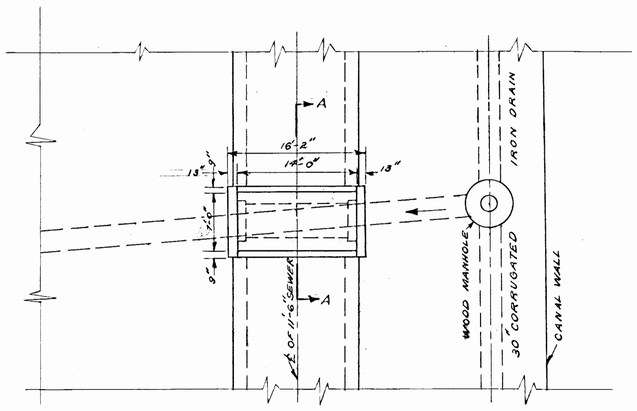
GREELEY AND HANSEN, ENGINEERS
By E R Selby
RESIDENT ENGINEER
UNDER DATE OF May 31 1937

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION
SEWER CROSSING
GENESEE STREET
REVISED DESIGN

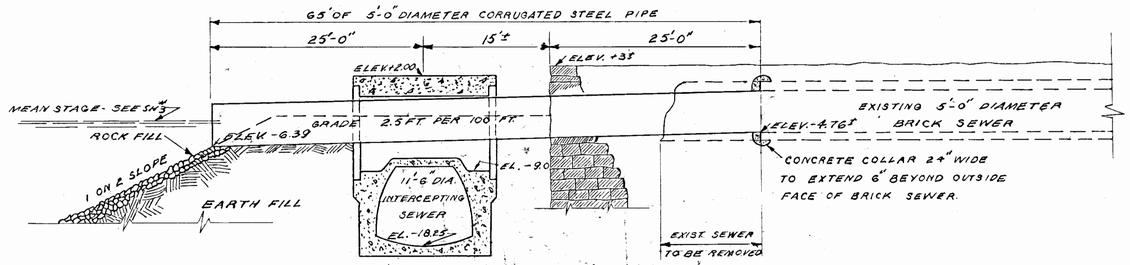
FEBRUARY 1937 SUPPLEMENTARY SHEET No. 11A
RECORD DRAWING SHEET 11A



PLAN

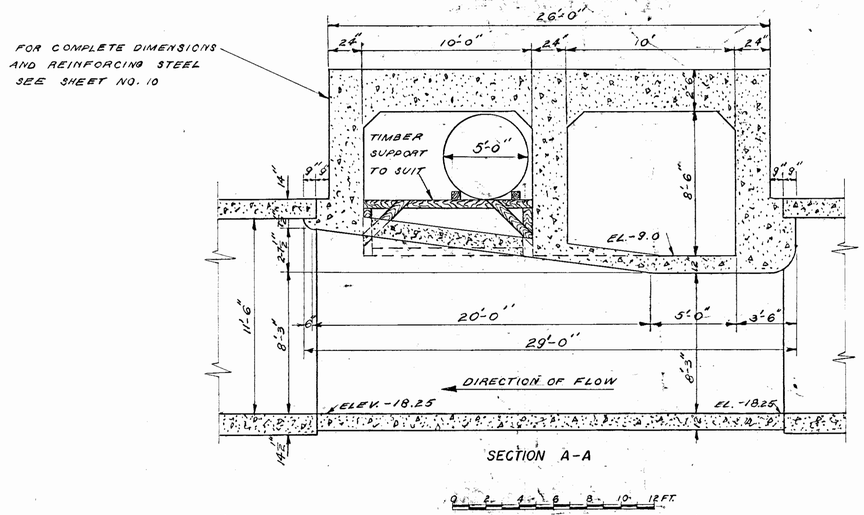


PLAN



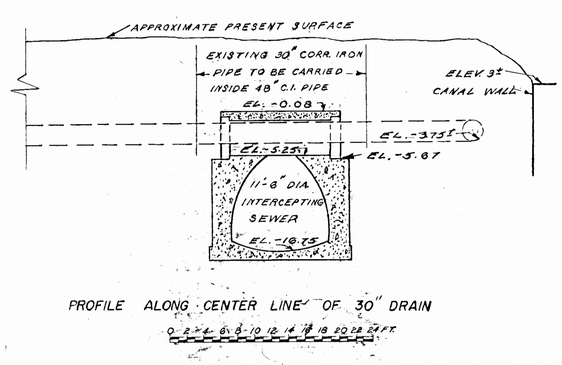
PROFILE ALONG CENTER LINE OF 5'-0" SEWER

0 2 4 6 8 10 12 14 16 18 20 22 24 FT.



0 2 4 6 8 10 12 FT.

STORM DRAIN OUTLET AT VIRGINIA ST.



PROFILE ALONG CENTER LINE OF 30" DRAIN

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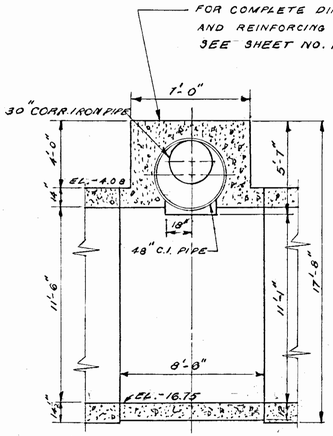


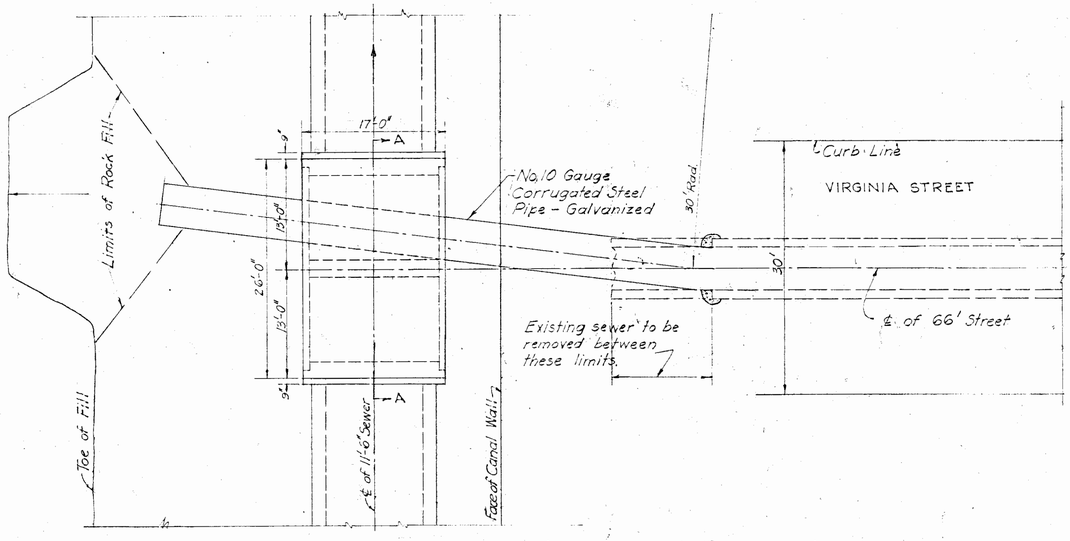
SECTION A-A

0 2 4 6 8 10 12 FT.

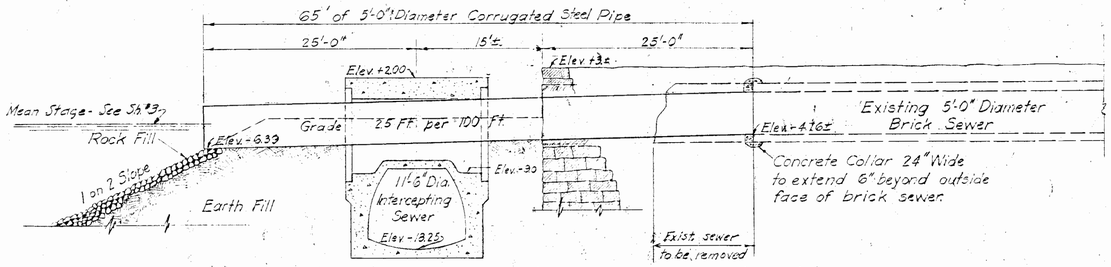
STORM DRAIN CROSSING NEAR CHARLES ST.

BUFFALO NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION
STORM DRAIN OUTLETS
VIRGINIA ST. AND CHARLES ST.

RECORD DRAWING
APRIL, 1936 14 SHEETS NO. 12



PLAN



PROFILE ALONG CENTER LINE OF 5'-0" SEWER

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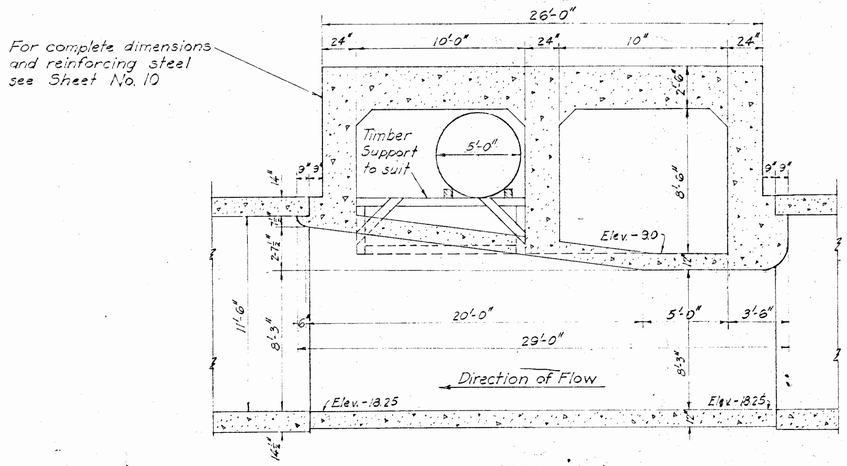
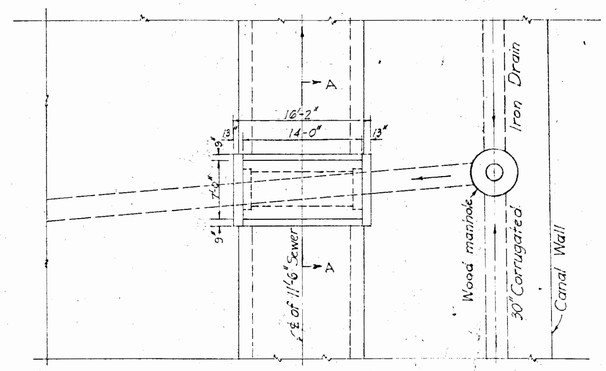


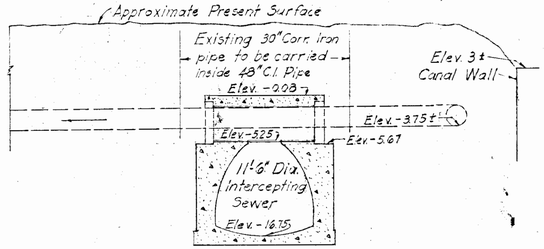
SECTION A-A

0 2 4 6 8 10 12 Ft.

STORM DRAIN OUTLET AT VIRGINIA ST.



PLAN



PROFILE ALONG CENTER LINE OF 30" DRAIN

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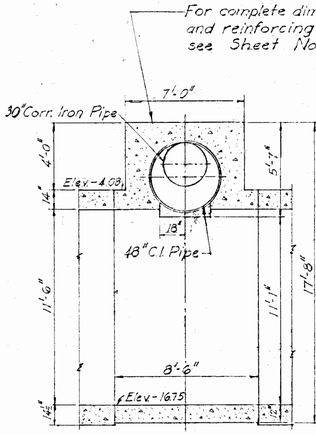
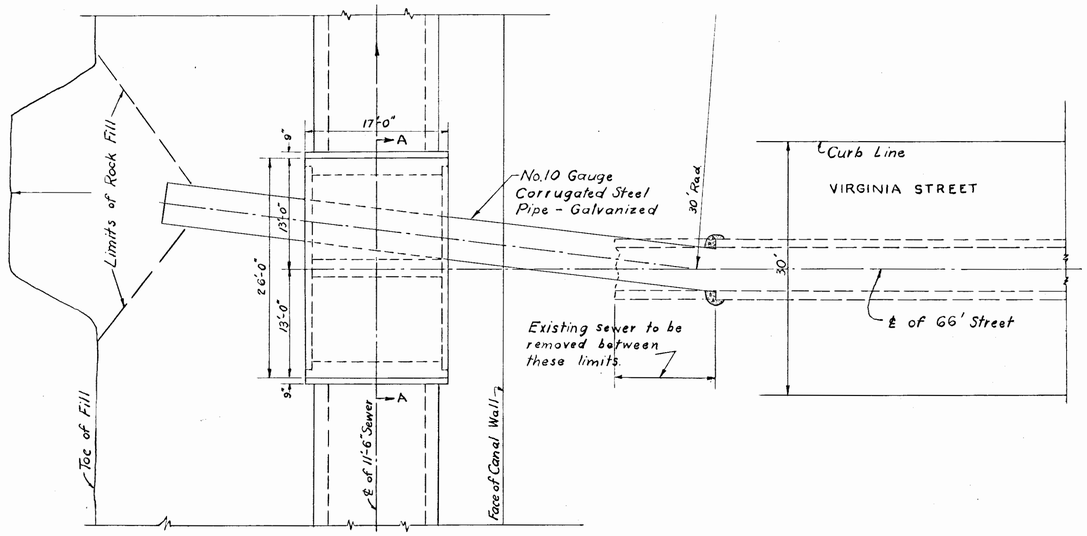


SECTION A-A

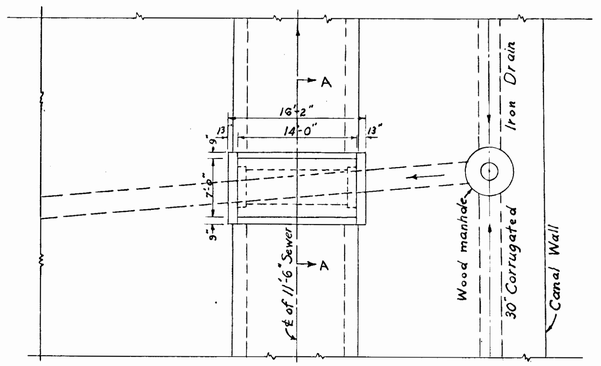
0 2 4 6 8 10 12 Ft.

STORM DRAIN CROSSING NEAR CHARLES ST.

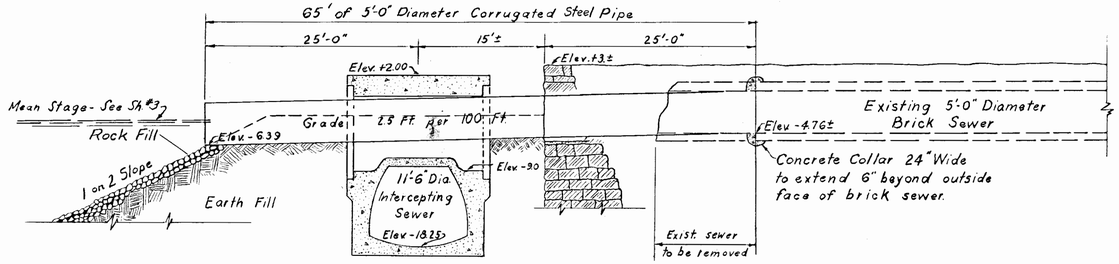
BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION
STORM DRAIN OUTLETS
VIRGINIA ST. AND CHARLES ST.
RECORD DRAWING
APRIL, 1936
14 SHEETS. No. 12



PLAN



PLAN



PROFILE ALONG CENTER LINE OF 5'-0" SEWER

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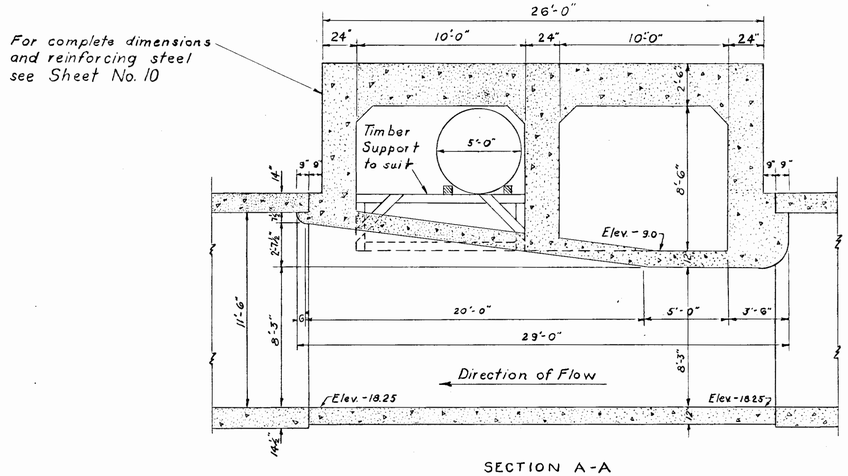
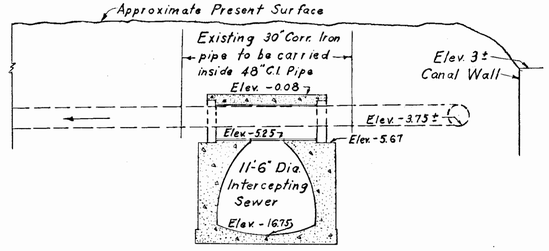


SECTION A-A

0 2 4 6 8 10 12 Ft.

STORM DRAIN OUTLET AT VIRGINIA ST.



PROFILE ALONG CENTER LINE OF 30" DRAIN

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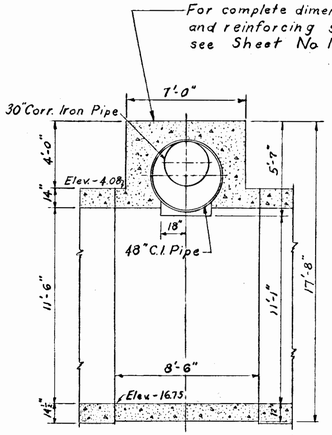


SECTION A-A

0 2 4 6 8 10 12 Ft.

STORM DRAIN CROSSING NEAR CHARLES ST.

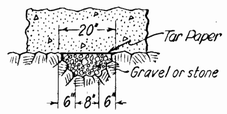
BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION

STORM DRAIN OUTLETS
VIRGINIA ST. AND CHARLES ST.

RECORD DRAWING

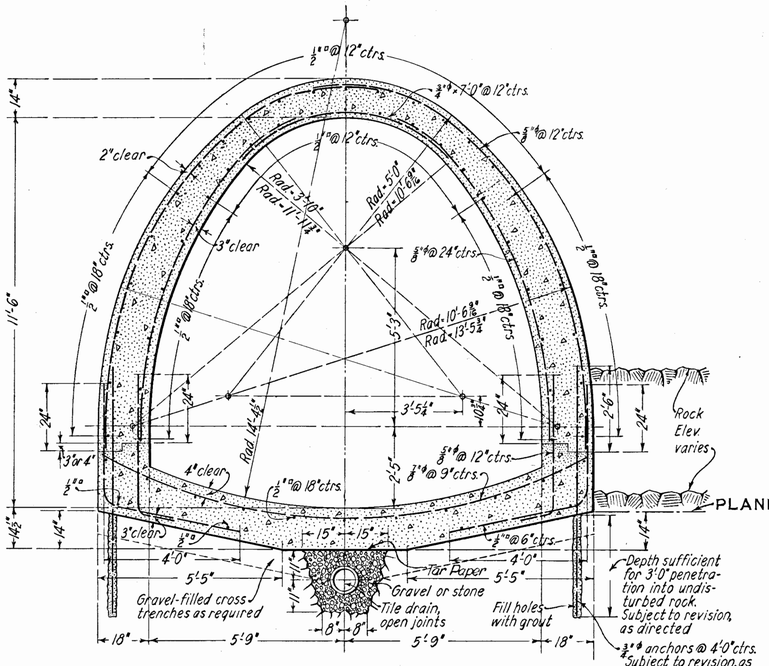
APRIL, 1938

14 SHEETS. No. 12

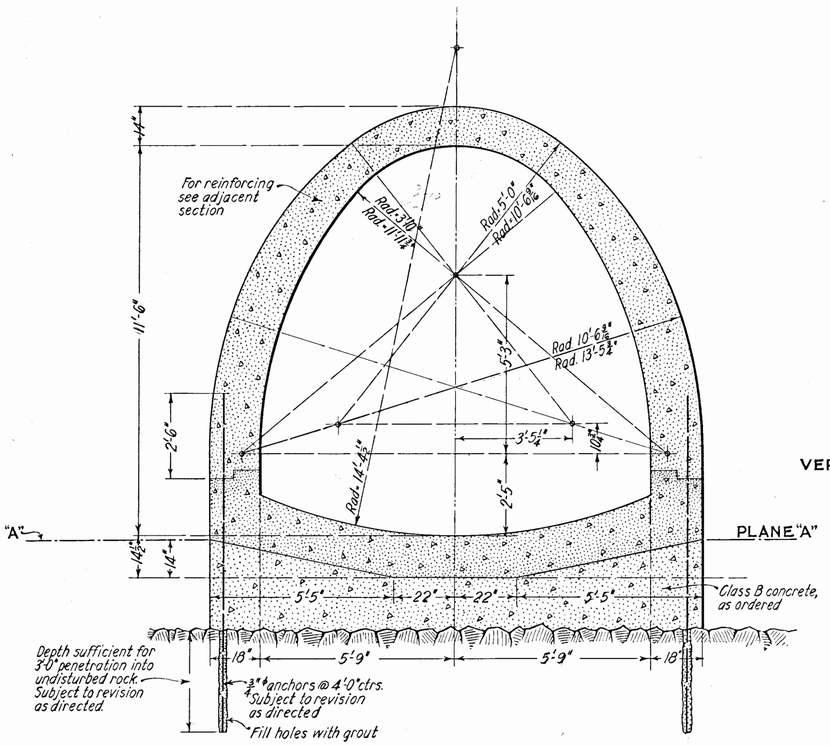


SECTION OF CROSS DRAIN

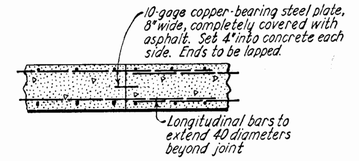
NOTE: Underdrains and anchors not included in price per linear foot for sewer. They shall be constructed as ordered by the Engineer and will be paid for under separate items.



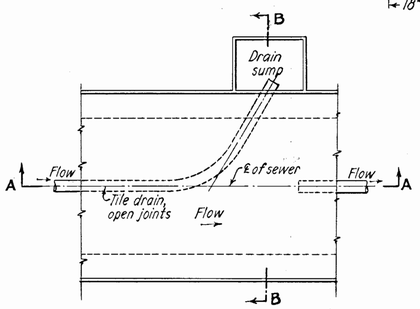
ROCK AT OR ABOVE PLANE "A"
Sta. 0-14.19 to Sta. 7+50
Sta. 13+25 to Sta. 60+75
Sta. 65+25 to Sta. 68+55
Sta. 68+85 to Sta. 85+82.30



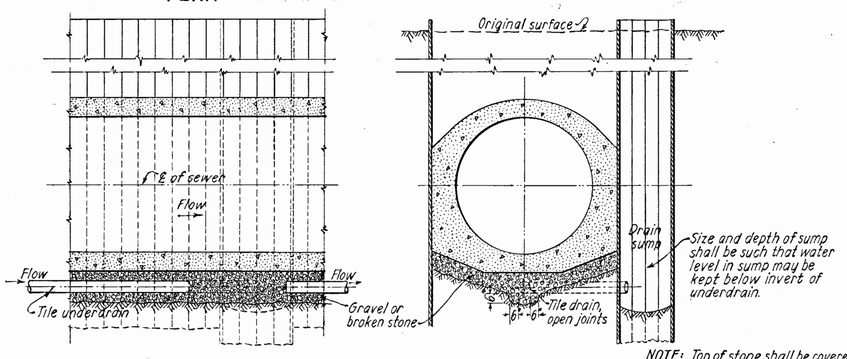
ROCK BELOW PLANE "A"
Sta. 7+50 to Sta. 10+24.7
Sta. 60+75 to Sta. 65+25
Sta. 68+55 to Sta. 68+85



DETAIL OF VERTICAL CONSTRUCTION JOINT



PLAN



SECTION A-A SECTION B-B

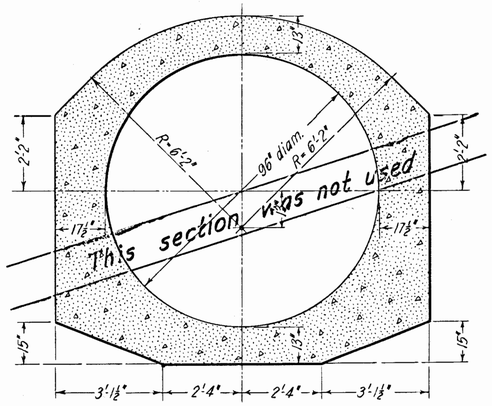
NOTE: Top of stone shall be covered with tar paper or other suitable material to prevent escape of mortar from concrete.

TYPICAL UNDERDRAIN DETAILS

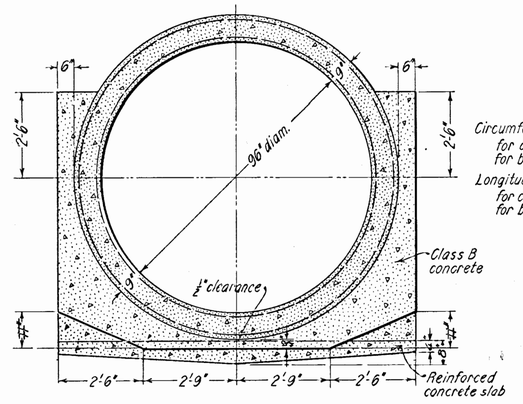
0 2 4 6 8 10 12 Ft.

STANDARD 11'-6" SEMI-ELLIPTICAL SECTION

0 1 2 3 4 5 6 Ft.



96" MONOLITHIC CONCRETE SECTION



96" REINFORCED CONCRETE PIPE SECTION

Circumferential Reinforcing: (each ring)
for cold-drawn wire, 0.84 sq. in. per lin. ft. of pipe.
for billet steel bars, 1.12 sq. in. per lin. ft. of pipe.
Longitudinal Reinforcing:
for cold-drawn wire, 3.5 sq. in. in the cross section.
for billet steel bars, 4.5 sq. in. in the cross section.

0 1 2 3 4 5 6 Ft.

APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF _____ 1936

_____
PROJECT ENGINEER, DOCKET N.Y. 1034 R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

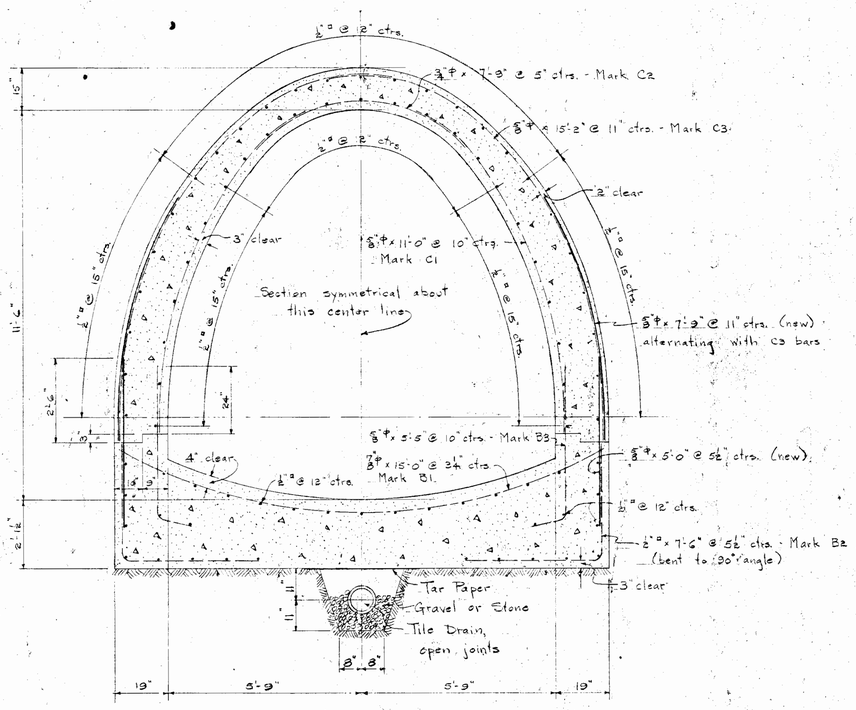
APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF _____ 1936

GREELEY AND HANSEN, ENGINEERS
BY _____
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF _____ 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION

SEWER SECTIONS AND DETAILS

RECORD DRAWING
APRIL, 1936
14 SHEETS No. 13



HEAVY SECTION IN EARTH
Sta. 10+24.7 to Sta. 13+24.7

Notes:-

Reinforcing bars which are same as those for rock section are shown with dash lines; additional new bars with solid lines.

Use same steel forms as for rock section without alteration, except that outer form is to be raised 1" and set 2" wider at the springing line.

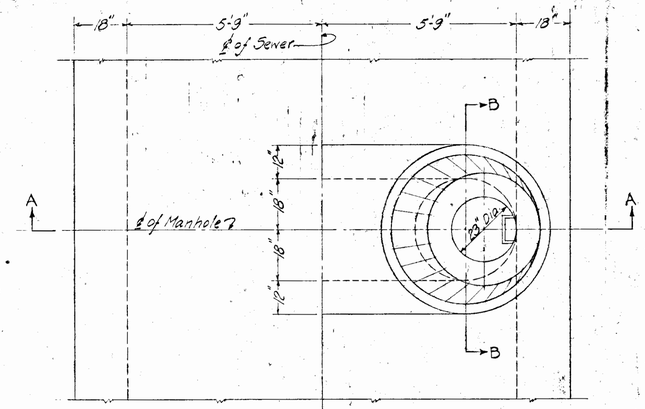
APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY
ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF Nov 17 1936
Harold Peters
PROJECT ENGINEER, DOCKET N.Y. 1034 R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

APPROVED
GREELEY & HANSEN
BY L. R. Velzy
Chief Engineer

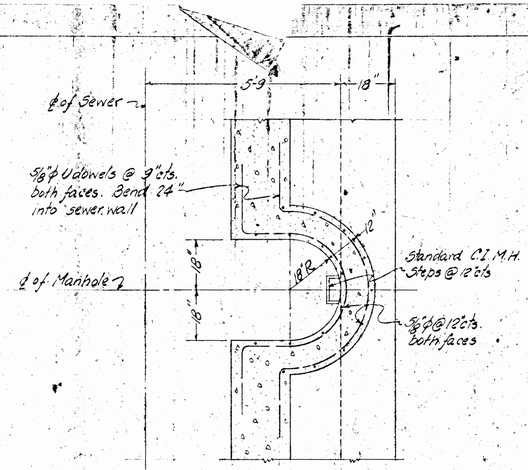
BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION

SEWER SECTION

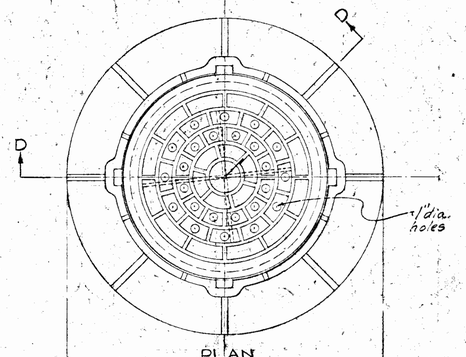
RECORD DRAWING
NOVEMBER, 1936 SUPPLEMENTARY SHEET No. 13A



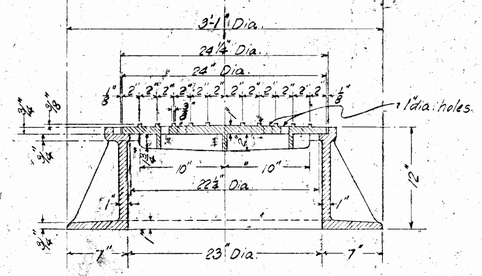
PLAN



SECTIONAL PLAN C-C



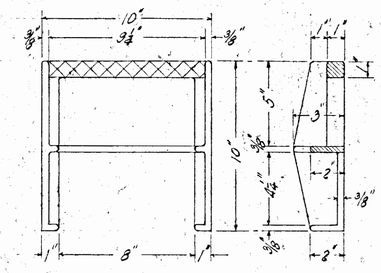
PLAN



SECTION D-D

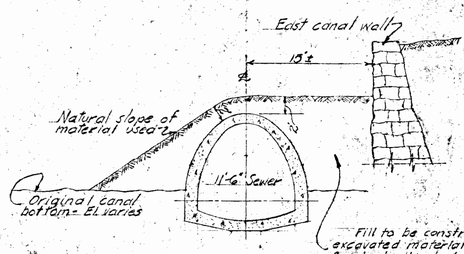
STANDARD M.H. FRAME & COVER

0 1 2 Ft.



CAST IRON MANHOLE STEP

0 3 6 9 12 in.

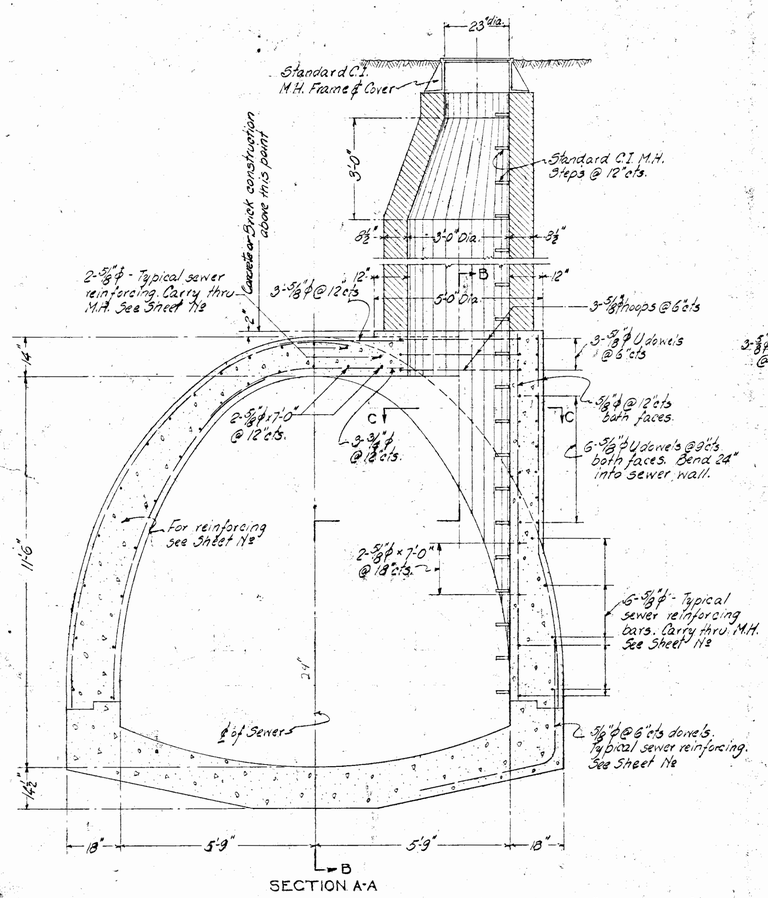


TYPICAL FILL SECTION
(Not to scale)

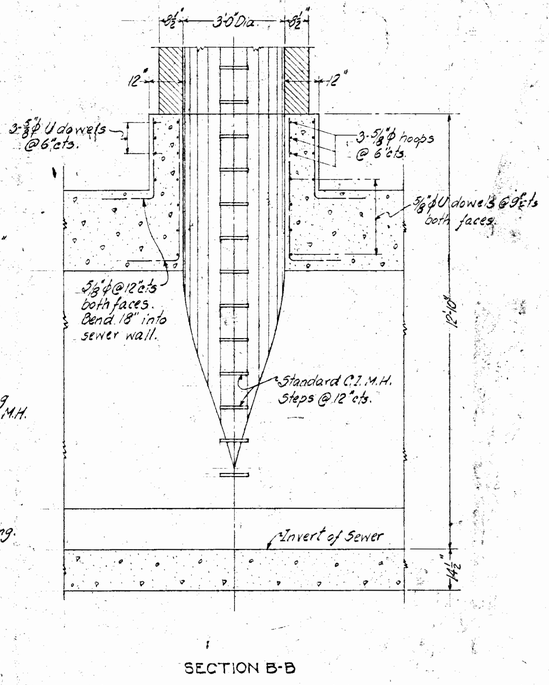
Fill to be constructed using surplus excavated material, to the lines, grades & extent directed by the Engineer. In general surplus excavated material may be deposited within the limits shown, at such locations as the Contractor may desire.

Except where ordered under "Item H-13, Selected Fill" no fill material in excess of that available from surplus excavated material will be required under Division H.

No large stones or masonry fragments shall be placed within 2 feet of the sewer structure.



SECTION A-A



SECTION B-B

STANDARD MANHOLE

0 1 2 3 4 5 6 Ft.

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION H
CANAL SECTION

MANHOLES AND DETAILS

RECORD DRAWING

APRIL 1936 14 SHEETS. NO. 14

Waterfront Redevelopment Project No. N.Y. R-35, Utility Replacement Contract (1975)

CITY OF BUFFALO

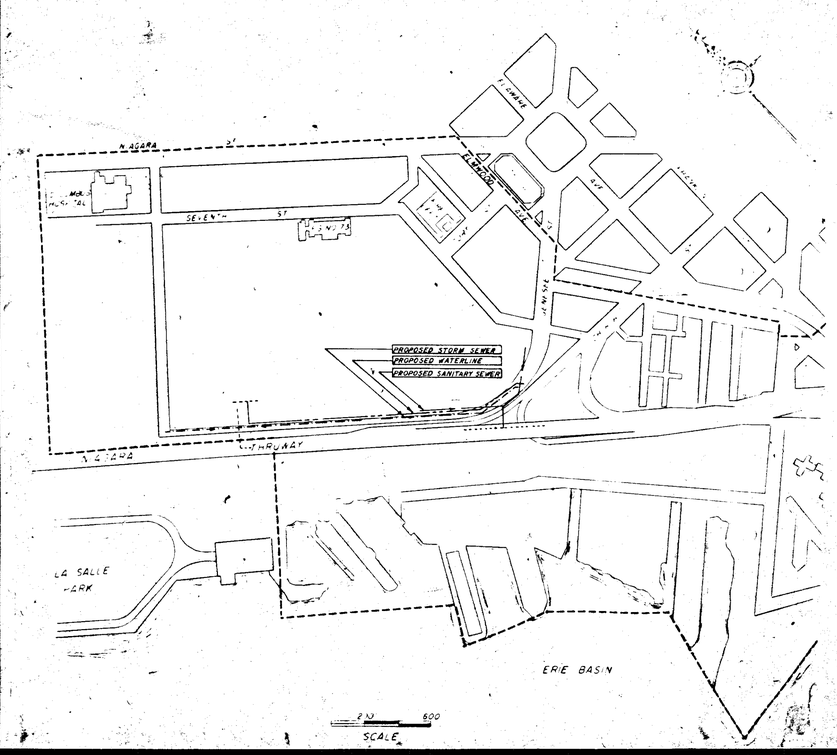
DEPARTMENT OF COMMUNITY DEVELOPMENT

WATERFRONT REDEVELOPMENT PROJECT NO. N.Y. R-35

UTILITY REPLACEMENT CONTRACT

1975

BID SECTION "D"



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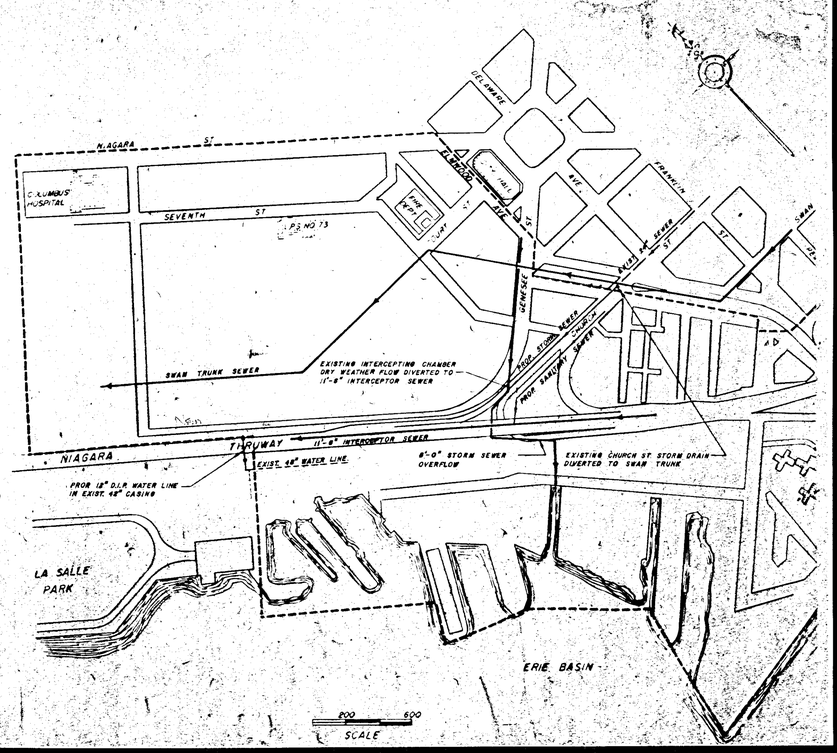


PREPARED AND RECOMMENDED BY
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS

DATE 7/16/75
Vito J Caruso, PE
Certificate No 027

CITY OF BUFFALO

APPROVED

DATE 10/1/75
Mayor Stanley M. Makowski

DATE 9/30/75
Richard L. Miller
Commissioner
Department of Community Development

DATE 10-1-75
Gillman J. Laehy, PE
General Manager
Buffalo Sewer Authority

New York State Department of Environmental Conservation
These plans for WR-35 Waterfront Redevelopment City of Buffalo
are hereby approved subject to the provisions of the Environmental Conservation Law
COMMISSIONER OF ENVIRONMENTAL CONSERVATION
David J. Bolan P.E.
Designated Representative
Date 5-17-76

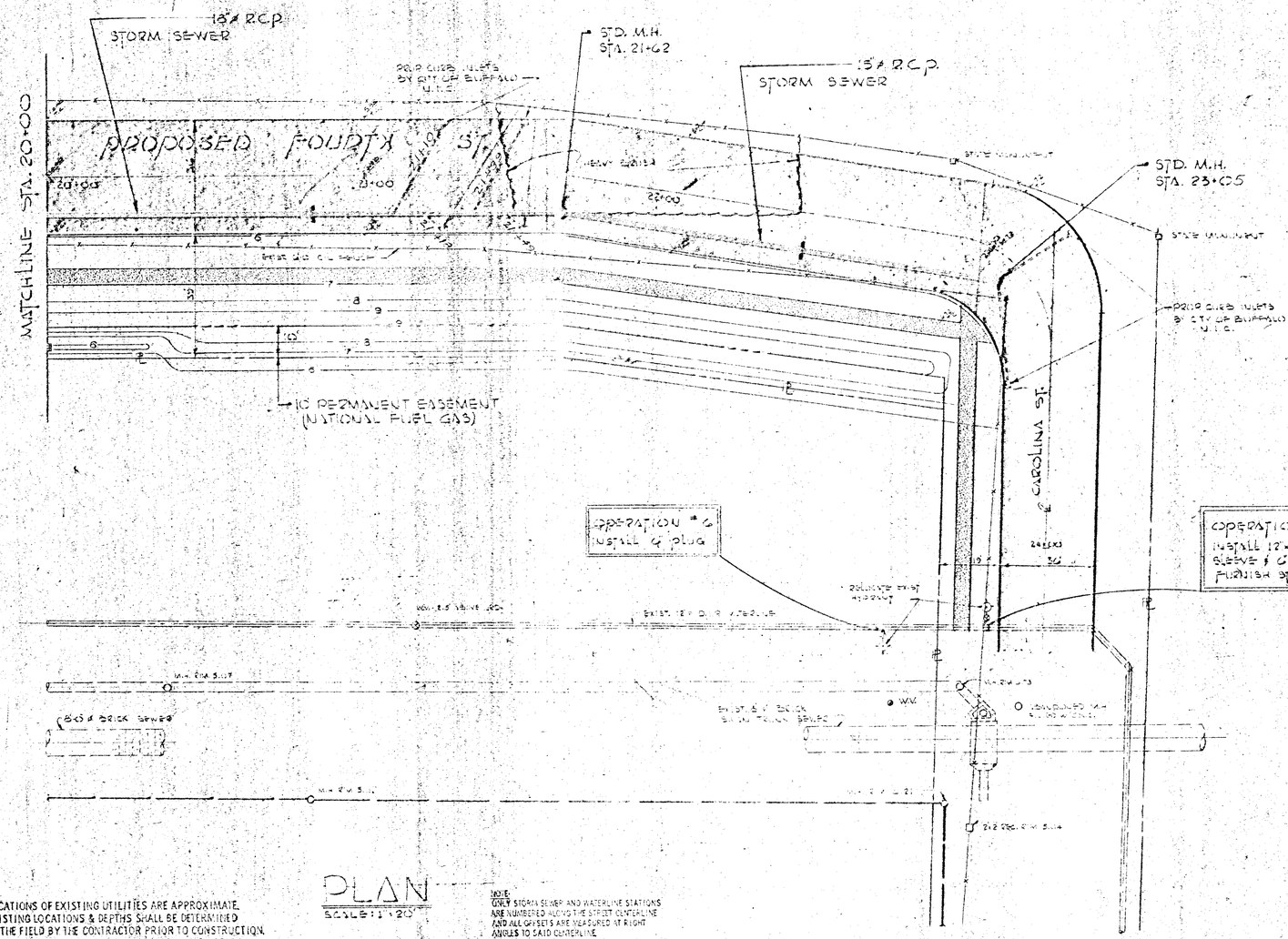
RECOMMENDED FOR APPROVAL
Michael O. Cholewka

NUSSBAUMER & CLARKE, INC.
ENGINEERS SURVEYORS
310 DELAWARE AVENUE BUFFALO, NEW YORK

1

S4376D

NIAGARA SECTION
NEW YORK STATE THRUWAY



PLAN
SCALE: 1"=20'

NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

MARIN CONCRETE CO.

AS BUILT SURVEY
AUGUST 6, 1976
Elwood D. Hummel
ELWOOD D. HUMMEL
LICENSED SURVEYOR #35059
341 SOUTH ST. EAST AURORA N.Y. 14052

NUSSBAUMER & CLARKE, INC.
A CONSULTING ENGINEERING AND LAND SURVEYING FIRM
PROFESSIONAL ENGINEERS AND LAND SURVEYORS
BUFFALO, NEW YORK

REVISIONS			DESIGNED BY: J.T	CHECKED BY: J.T
NO.	BY	DATE	DRAWN BY: J.P.M.	CHECKED BY: N.M.
1	J.P.M.	8-18-76	DATE: MAY 1975	SCALE: AS NOTED
			JOB NO. 69-149	REPORT NO.
			DRAWING NO. C-6627-11	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

BID SECTION "D"
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER: STA. 20+00 TO STA. 23+00

SHEET NO. 11 OF 16

34376D

LIST OF DRAWINGS

BID SECTION "D"

DWG. NO.	DESCRIPTION
1	TITLE SHEET
2	LIST OF DRAWINGS
3	PLAN: STA. -0+46 TO STA. 5+00 STA. 1+69 "A" TO STA. 6+68 "A" STA. 0+00 "B" TO STA. 1+24 "B"
4	PROFILE: STA. -0+46 TO STA. 5+00 STA. 0+00 "A" TO STA. 6+00 "A"
5	PLAN: STA. 5+00 TO STA. 10+00 STA. 6+68 "A" TO STA. 8+24 "A"
6	PROFILE: STA. 5+00 TO STA. 10+00 STA. 6+00 "A" TO STA. 8+24 "A" STA. 0+00 "B" TO STA. 1+24 "B"
7	PLAN: STA. 10+00 TO STA. 15+00
8	PROFILE: STA. 10+00 TO STA. 15+00
9	PLAN: STA. 15+00 TO STA. 20+00 STA. 0+00 "C" TO STA. 2+12 "C"
10	PROFILE: STA. 15+00 TO STA. 23+00 STA. 0+00 "C" TO STA. 2+12 "C"
11	PLAN: STA. 20+00 TO STA. 23+00
12	HYDRANT, VALVE & TEE DETAILS; THRUST BLOCK DETAILS FOR WATERLINES
13	STANDARD PRECAST MANHOLE DETAIL & SPUR CONNECTION PIPE
14	MANHOLE FRAME & COVER DETAILS
15	TRENCH DETAILS FOR SEWER AND WATER LINES
16	MISCELLANEOUS DETAILS

NUSSBAUMER & CLARKE, INC.
A CORPORATION MEDE AND TO PRACTICE
PROFESSIONAL ENGINEERING & LAND SURVEYING
IN THE STATE OF NEW YORK
CERTIFICATE NO. 037
VITO GRASSO
PRESIDENT

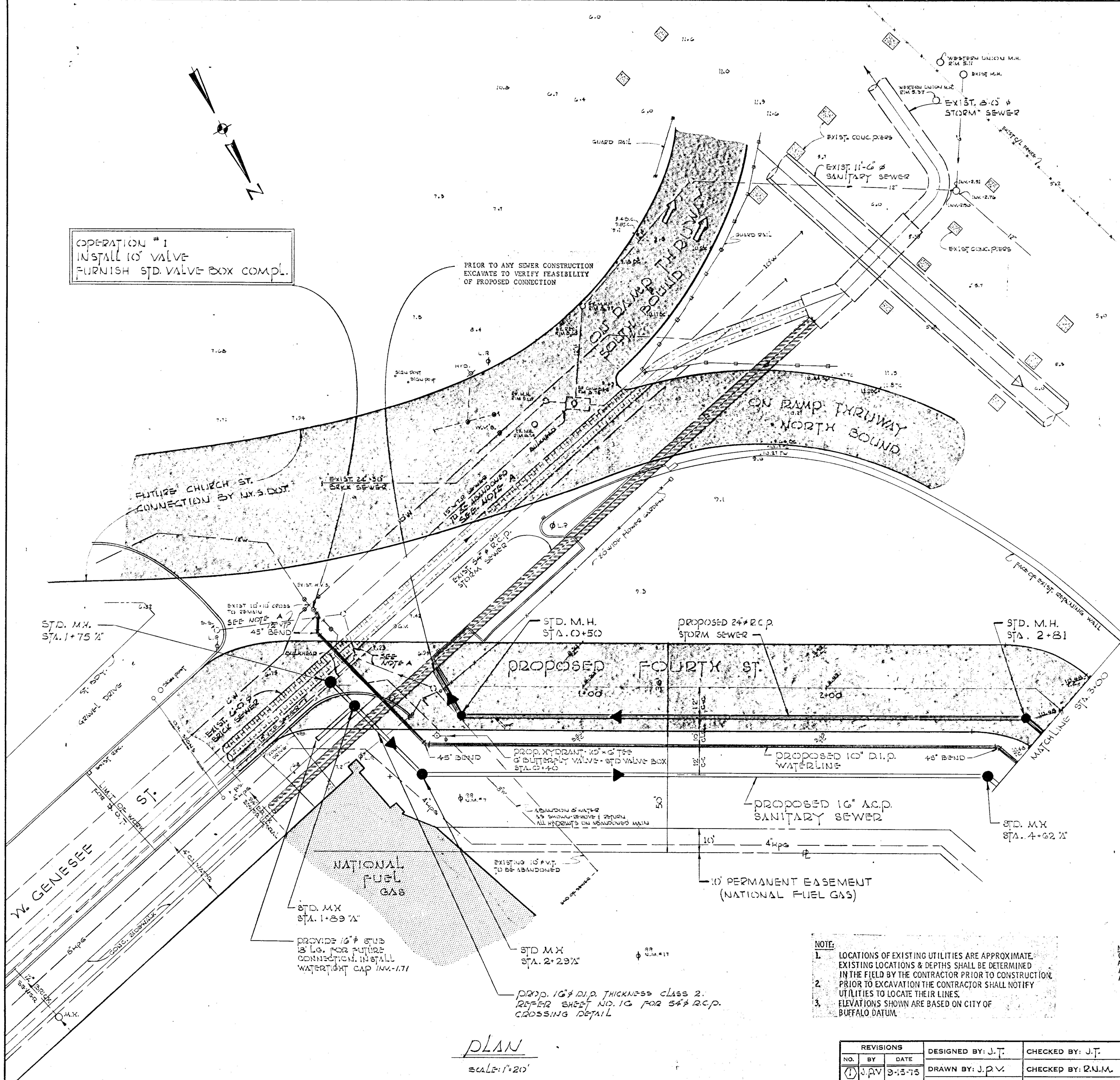
REVISIONS				
NO.	BY	DATE		
1	JPV.	9-13-75		
DESIGNED BY: J.T.			CHECKED BY: J.T.	
DRAWN BY: J.P.V.			CHECKED BY: R.N.M.	
DATE: MAY 1975			SCALE: NONE	
JOB NO. 68-149			REPORT NO.	
DRAWING NO. C-6627-2				

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

LIST OF DRAWINGS

SHEET NO. 2 OF 16

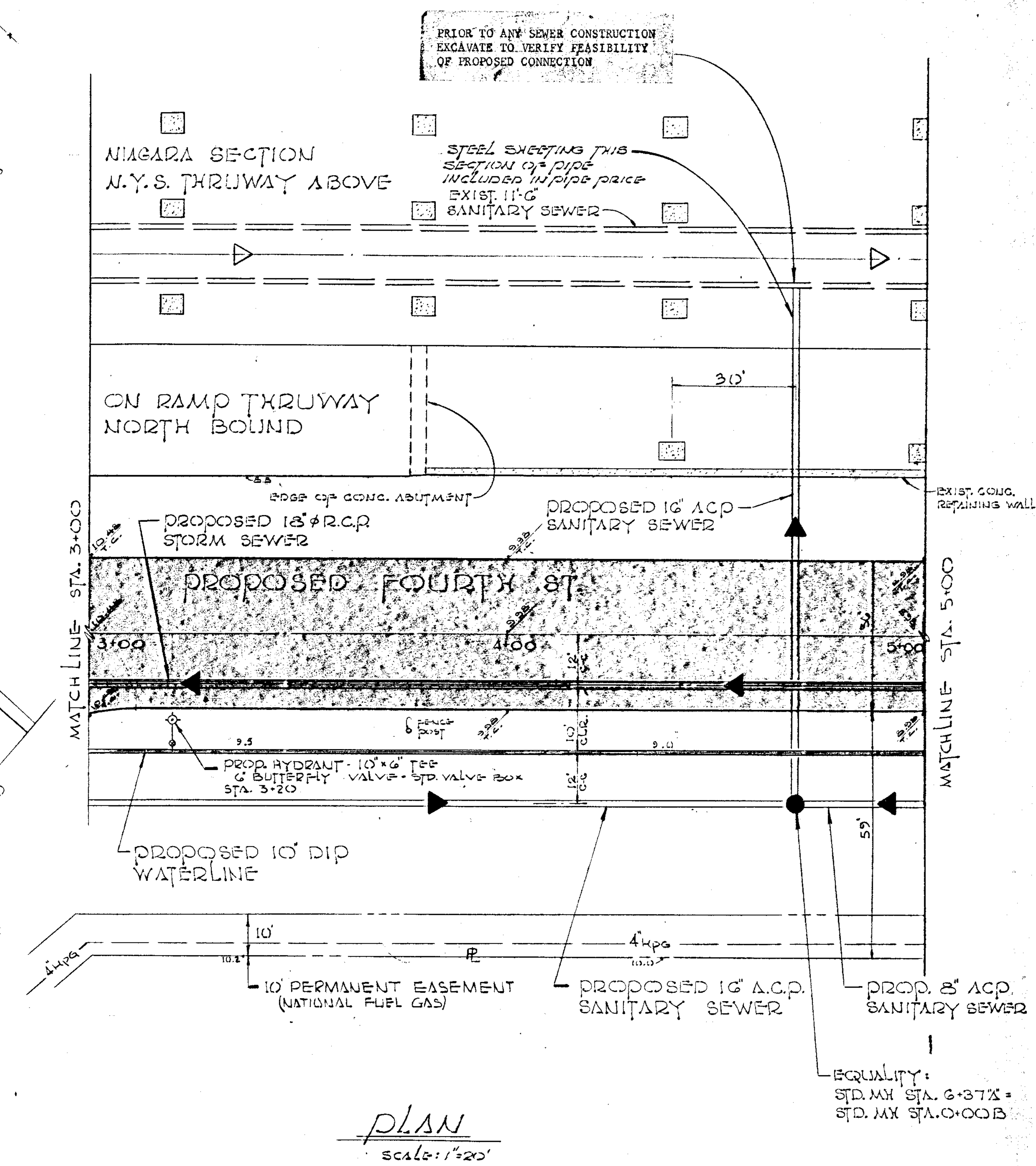


PLAN

SCALE: 1"=20'

NOTE A

BULKHEAD AND ABANDON EXISTING SEWER (COST INCLUDED IN BID ITEM NO. 1)
FILL ABANDONED SEWER WITH 1 TO 10 MIX CONCRETE BACKFILL (PAYMENT UNDER CONTINGENT ITEM U-8)
REMOVE MANHOLE FRAMES AND COVERS FROM ABANDONED MANHOLES AND DELIVER TO LOCATION TO BE DESIGNATED BY THE BUFFALO SEWER AUTHORITY.
FILL MANHOLES WITH 2" R.C.C. (PAYMENT UNDER BID ITEM NO. 6) AND PAVE DISTURBED AREAS TO LIMITS TO BE DETERMINED BY THE ENGINEER (PAYMENT UNDER BID ITEM NO. 7).



PLAN

SCALE: 1"=20'

NOTE:

1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

WATERLINE NOTES

1. OPERATIONS LISTED #1 to #7 INCLUSIVE WILL BE DONE BY THE CITY OF BUFFALO WATER DEPARTMENT.
2. EXCAVATION, BACKFILLING AND ALL OTHER NECESSARY WORK TO PERFORM THESE OPERATIONS WILL BE DONE BY THE CONTRACTOR.
3. THE CONTRACTOR WILL REIMBURSE THE CITY OF BUFFALO WATER DEPARTMENT FOR THEIR ENTIRE COST OF THESE OPERATIONS, AND SHALL INCLUDE THIS COST IN THE BID PRICES.

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE No. 021
VITO CARUSO
PRESIDENT

BID SECTION "D"

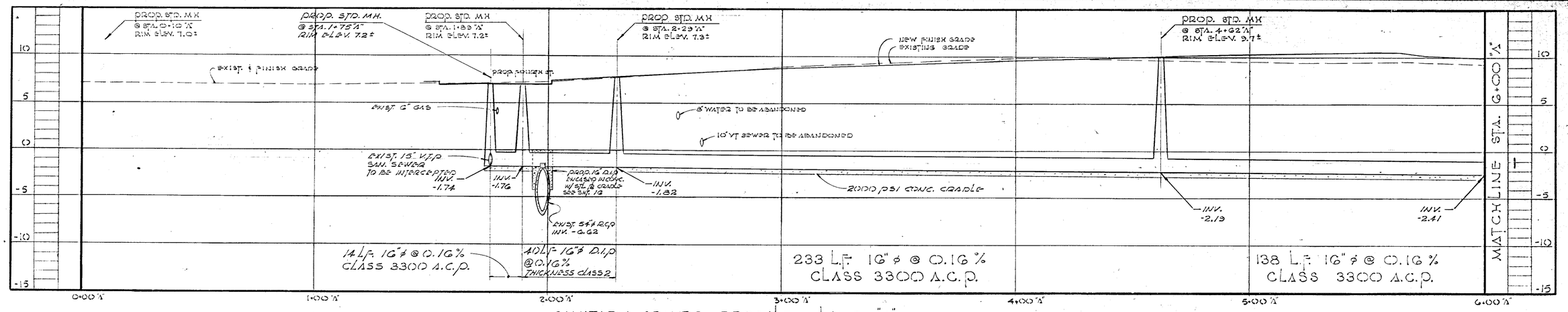
REVISIONS				
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.
1	J.P.V	9-15-75	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
			DATE: MAY 1975	SCALE: AS NOTED
			JOB NO. 68-149	REPORT NO.
			DRAWING NO. C-6627-3	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

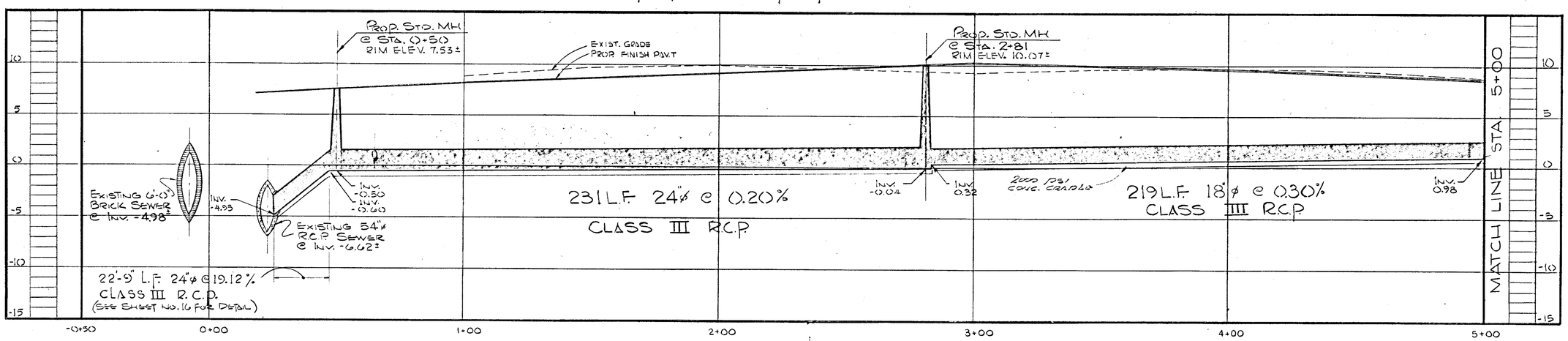
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

SANITARY SEWER: STA. 1+69"A" TO 6+68"A", 0+00"B" TO 1+24"B"
STORM SEWER: STA. 0+28 TO STA. 5+00
WATER LINE: STA. -0+46 TO STA. 5+00

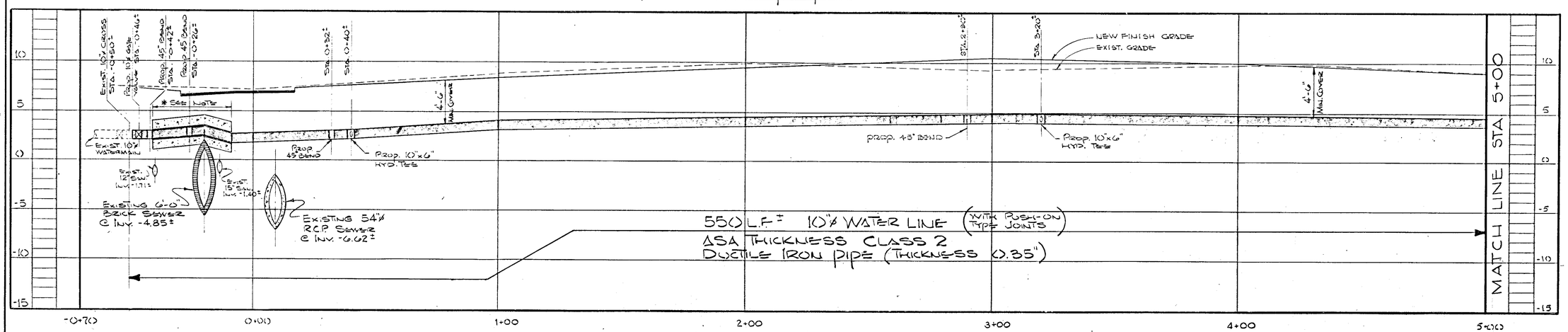
SHEET NO. 3 OF 16



SANITARY SEWER PROFILE - LINE "A"



STORM SEWER PROFILE



WATER LINE PROFILE

* NOTE:
PROVIDE INSULATION, WATERTIGHT WRAPPING AND CONCRETE ENCASEMENT STATION -0+09 ± TO STATION -0+41 ±

NOTE:
BACKFILL WITH SELECT MATERIAL TRENCHES IN EXISTING AND PROPOSED PAVEMENT AREAS

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

REVISIONS					
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.	
①	J.P.V.	9-15-75	DRAWN BY: R.M./J.V.	CHECKED BY: R.U.M.	
			DATE: MAY 1975	SCALE: HOR: 1"=20' VERT: 1"=5'	
			JOB NO. 68-149	REPORT NO.	
			DRAWING NO. C-6627-4		

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

BID SECTION "D"

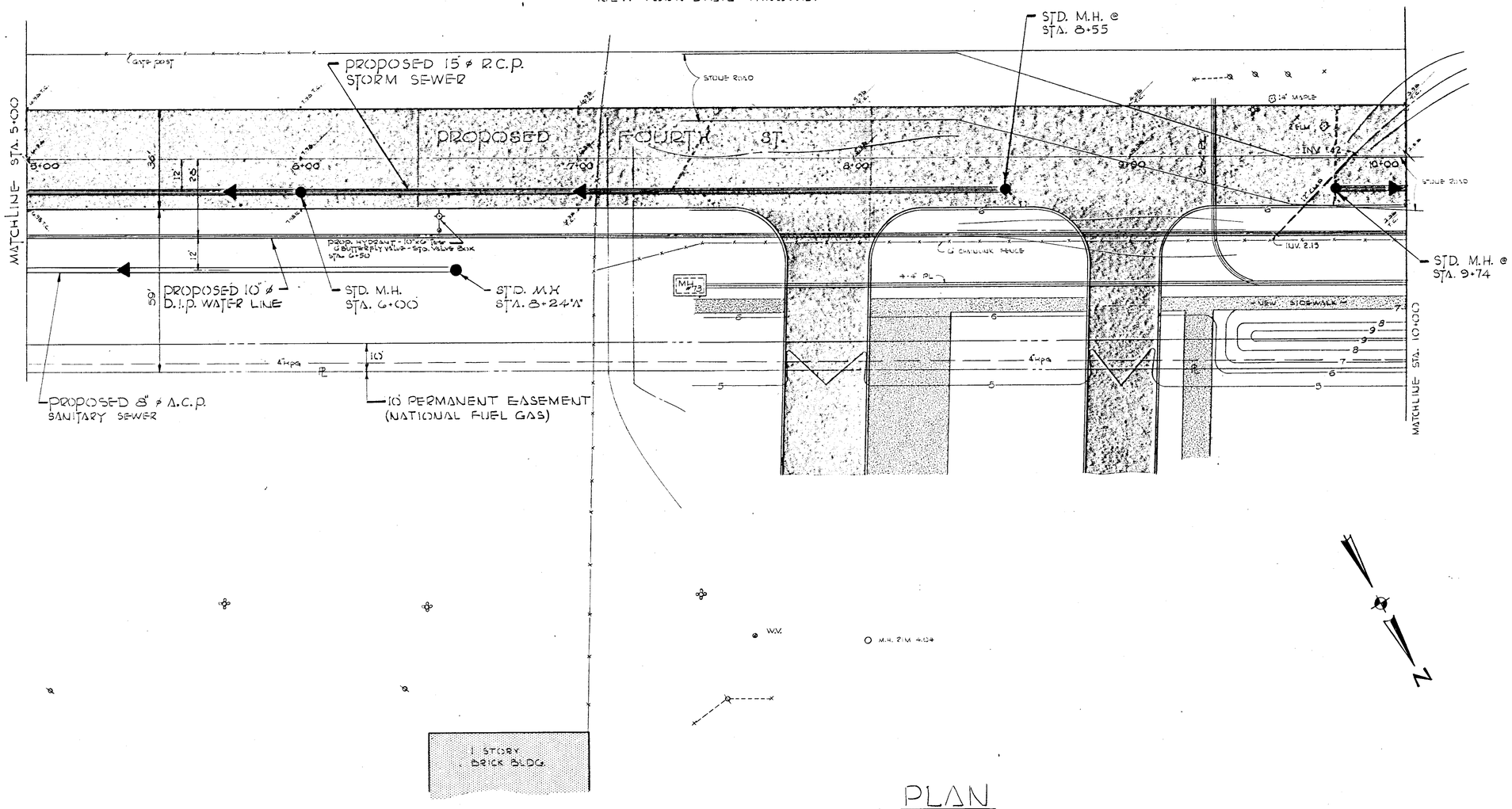
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

SANITARY SEWER: STA. 0+00 "A" TO STA. 6+00 "A"
STORM SEWER: STA. 0+28 TO STA. 5+00
WATER LINE: STA. -0+46 TO STA. 5+00

SHEET NO. 4 OF 16

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE No. 937
VITO GARUSO
PRESIDENT

NIAGARA SECTION
NEW YORK STATE THRUWAY



PLAN
SCALE: 1"=20'

NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
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NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE No. 027
VITO CARUSO
PRESIDENT

BID SECTION "D"

REVISIONS		
NO.	BY	DATE
1	J.P.V.	5-13-75

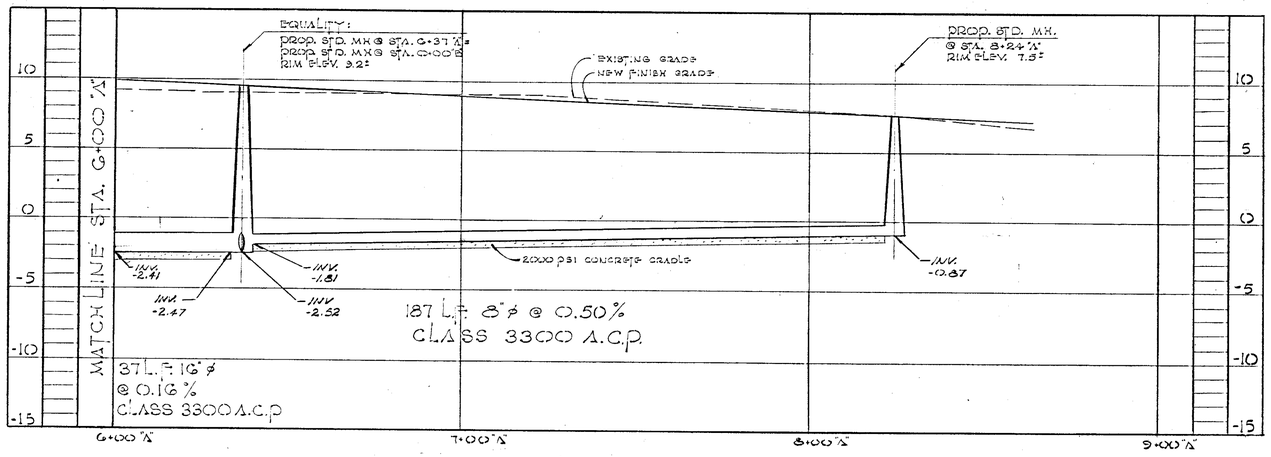
DESIGNED BY: J.T.	CHECKED BY: J.T.
DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
DATE: MAY 1975	SCALE: AS NOTED
JOB NO. 68-149	REPORT NO.
DRAWING NO. C-6627-5	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

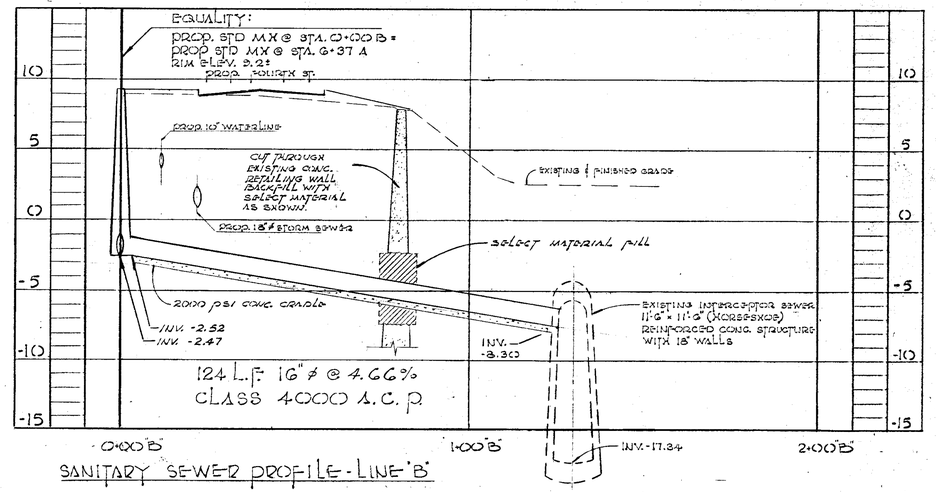
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

SANITARY SEWER: STA.6+68"A" TO STA. 8+24"A"
STORM SEWER: STA.5+00 TO 8+55, STA.9+74 TO 10+00
WATER LINE: STA.5+00 TO STA.10+00

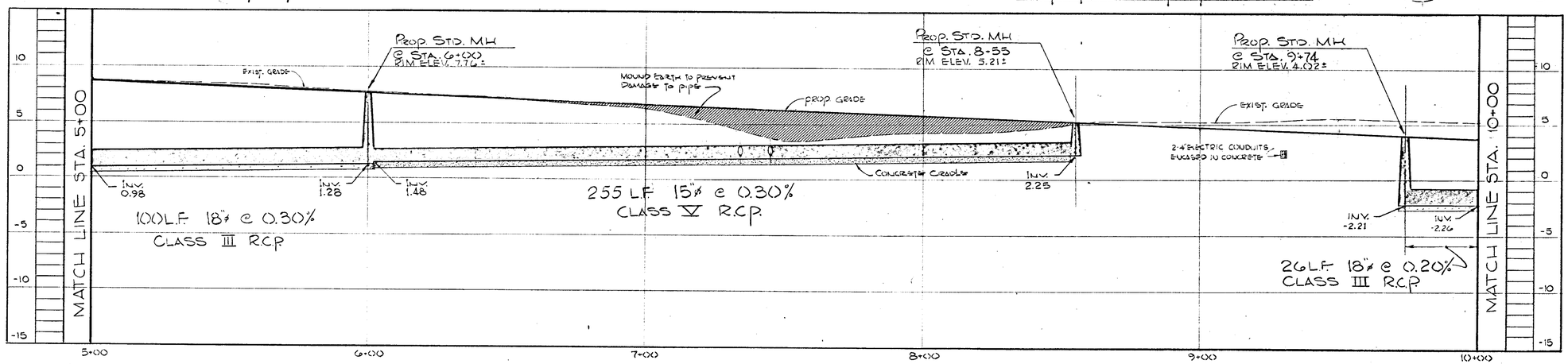
SHEET NO. 5 OF 16



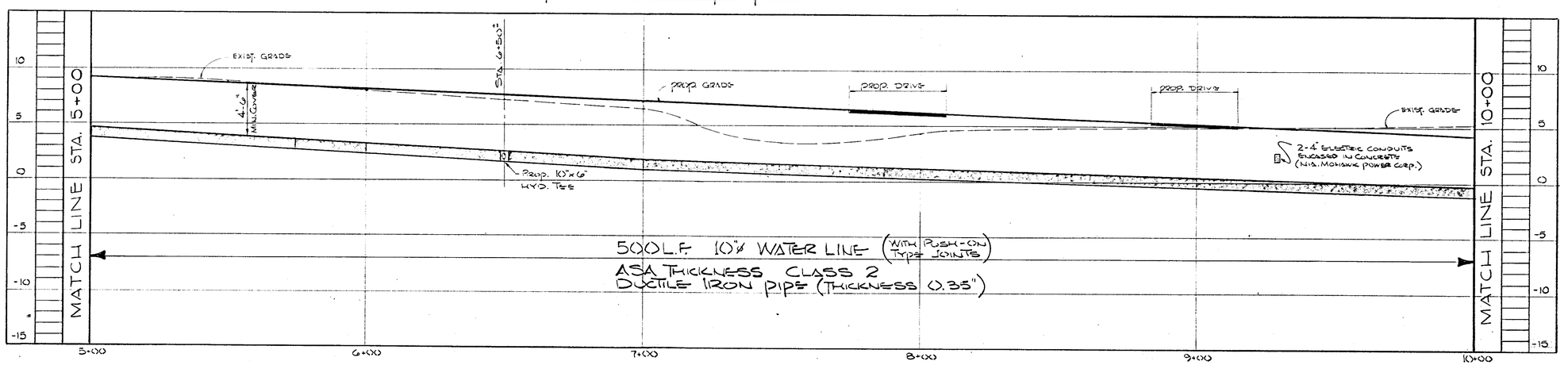
SANITARY SEWER PROFILE - LINE 'A'



SANITARY SEWER PROFILE - LINE 'B'



STORM SEWER PROFILE



WATER LINE PROFILE

NOTE: BACKFILL WITH SELECT MATERIAL TRENCHES IN EXISTING AND PROPOSED PAVEMENT AREAS.

NOTE: ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

REVISIONS				
NO.	BY	DATE		
1	J.P.V.	9-15-75		
DESIGNED BY: J.T.			CHECKED BY: J.T.	
DRAWN BY: R.M./J.V.			CHECKED BY: R.N.M.	
DATE: MAY 1975			SCALE: HOR.: 1"=20' VERT.: 1"=5'	
JOB NO. 68-149			REPORT NO.	
DRAWING NO. C-6627-6				

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE No. 037
VITO C. CARUSO
PRESIDENT

BID SECTION "D"

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

SANITARY SEWER: STA. 6+00 'A' TO 8+24 'A'; 0+00 'B' TO 1+24 'B'
STORM SEWER: STA. 5+00 TO 8+55; 9+74 TO 10+00
WATERLINE: STA. 5+00 TO STA. 10+00

SHEET NO. 6 OF 16

N

NIAGARA SECTION
NEW YORK STATE THRUWAY

EXIST. 11'-6" SANITARY SEWER

EX. M.H. RIM 4.43

18" ϕ

STD. M.H.@ STA. 13+23

PROPOSED 18" ϕ R.C.P. STORM SEWER

STONE ROAD

PROP CURB INLETS BY CITY OF BUFFALO U.I.C.

PROPOSED FOURTH ST.

PROPOSED 24" ϕ R.C.P. STORM SEWER

MATCH LINE STA. 10+00

MATCH LINE STA. 15+00

10+00 11+00 12+00 13+00 14+00 15+00

PROP HYDRANT-10"xGTEE & BUTTERFLY VALVE-STD. STA. 10+20

VALVE BOX

MH #101

4-4" PL

NEW SIDEWALK

4"PPS

10'

PL

MH #125

10' PERMANENT EASEMENT (NATIONAL FUEL GAS)

PROPOSED 10" ϕ D.I.P. WATER LINE

12-4" PL

○ M.H. RIM 4.21

○ STD. M.H. RIM 3.57

○ ST. M.H. RIM 4.80

○ M.H.

NOTE:
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2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

PLAN
SCALE: 1" = 20'

NOTE:
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NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE NO. 047
VITO CARUSO
PRESIDENT

BID SECTION "D"

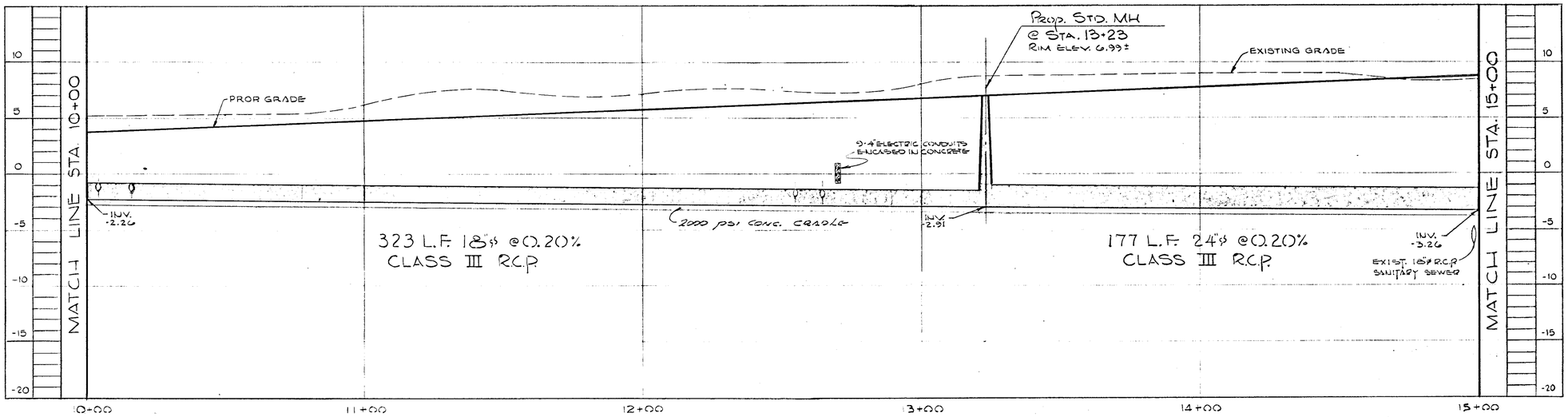
REVISIONS					
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.	
1	J.P.V.	9-15-75	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.	
			DATE: MAY 1975	SCALE: AS NOTED	
			JOB NO. 68-149	REPORT NO.	
			DRAWING NO. C-6627-7		

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

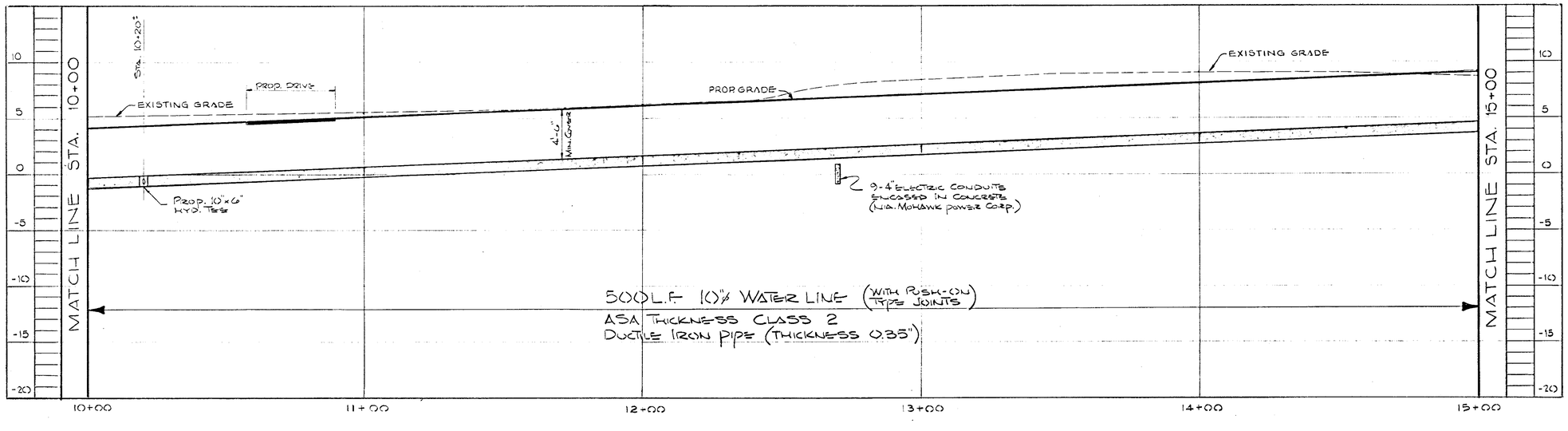
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER: STA. 10+00 TO STA. 15+00
WATER LINE: STA. 10+00 TO STA. 15+00

SHEET NO. 7 OF 16



STORM SEWER PROFILE



WATER LINE PROFILE

NOTE: BACKFILL WITH SELECT MATERIAL TRENCHES IN EXISTING AND PROPOSED PAVEMENT AREAS

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE No. 037
VITO CARUSO
PRESIDENT

BID SECTION "D"

REVISIONS		
NO.	BY	DATE
1	J.P.V.	9-15-75

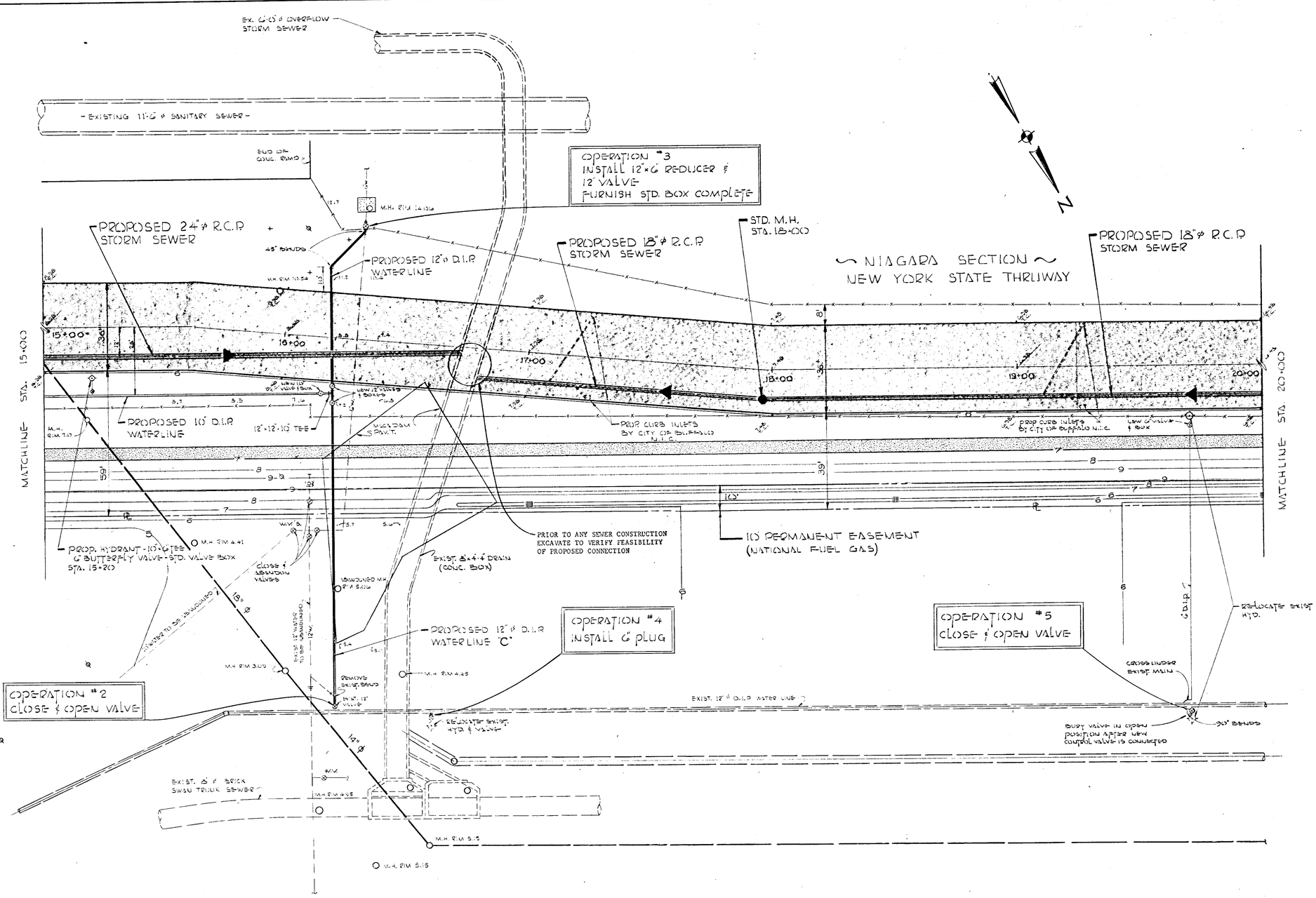
DESIGNED BY: J.T.	CHECKED BY: J.T.
DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
DATE: MAY 1975	SCALE: HOR: 1"=20' VERT: 1"=5'
JOB NO. 68-149	REPORT NO.
DRAWING NO. C-6627-8	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER: STA. 10+00 TO STA. 15+00
WATER LINE: STA. 10+00 TO STA. 15+00

SHEET NO. 8 OF 16



NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

PLAN
SCALE 1"=20'

NOTE:
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NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE NO. 037
VITO CALUSO
PRESIDENT

BID SECTION "D"

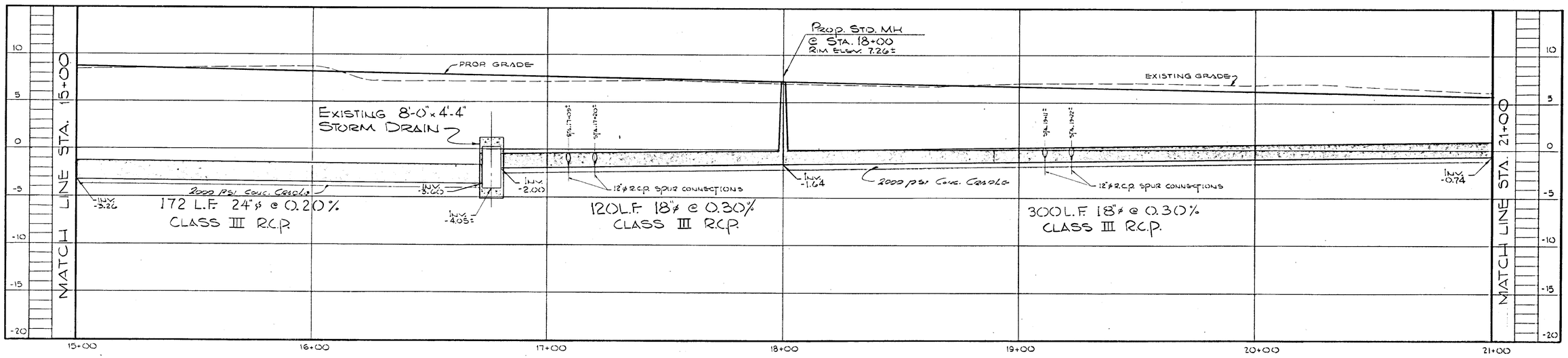
REVISIONS				
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.
1	J.P.V.	5-13-75	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
			DATE: MAY 1975	SCALE: AS NOTED
			JOB NO. 68-143	REPORT NO.
			DRAWING NO. C-6627-9	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

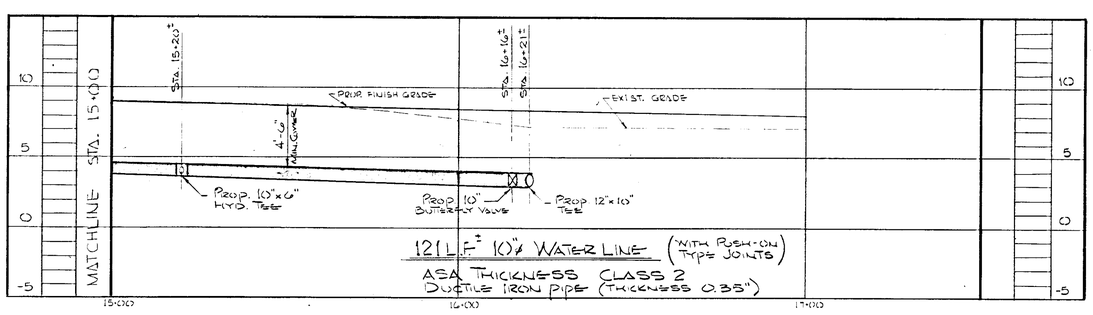
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER STA. 15+00 TO 16+72 ; 16+80 TO 20+00
WATER LINE: STA. 15+00 TO 16+21 ; 0+00"C" TO 2+12"C"

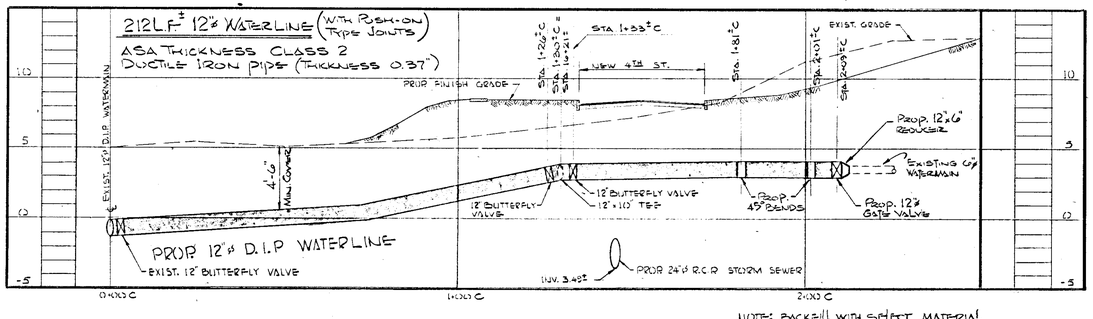
SHEET NO. 9 OF 16



STORM SEWER PROFILE

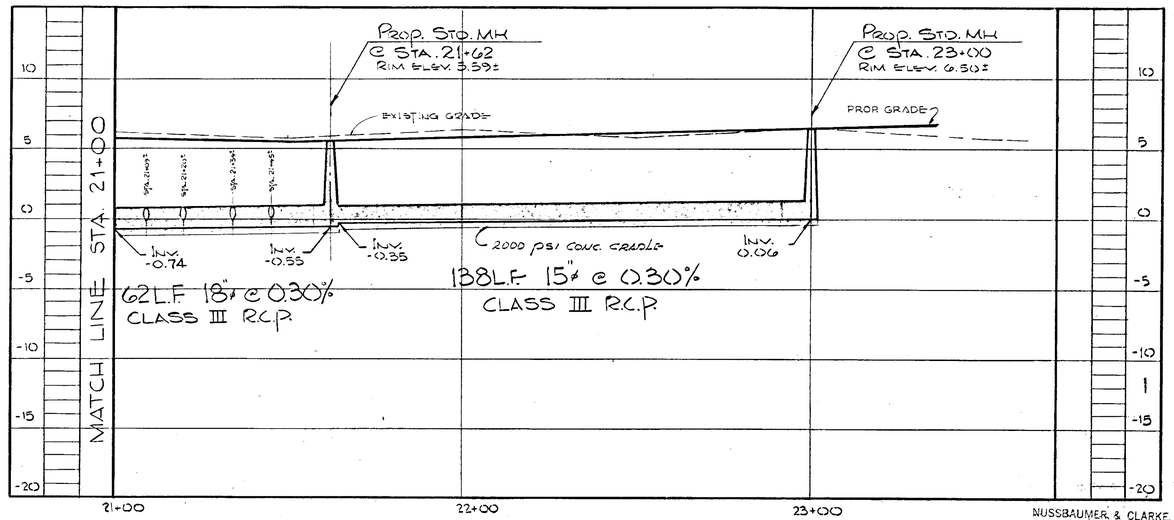


WATER LINE PROFILE



WATER LINE PROFILE - LINE "C"

NOTE: BACKFILL WITH SELECT MATERIAL TRENCHES IN EXISTING AND PROPOSED PAVEMENT AREAS.



STORM SEWER PROFILE

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE No. 027
RTO CARUSO
PRESIDENT

BID SECTION "D"

REVISIONS		
NO.	BY	DATE
1	J.P.V.	2-13-75

DESIGNED BY: J.T.	CHECKED BY: J.T.
DRAWN BY: R.W./J.P.	CHECKED BY: R.N.M.
DATE: MAY 1973	SCALE: HOR.: 1"=20' VERT.: 1"=5'
JOB NO. 68-149	REPORT NO.
DRAWING NO. C-6627-10	

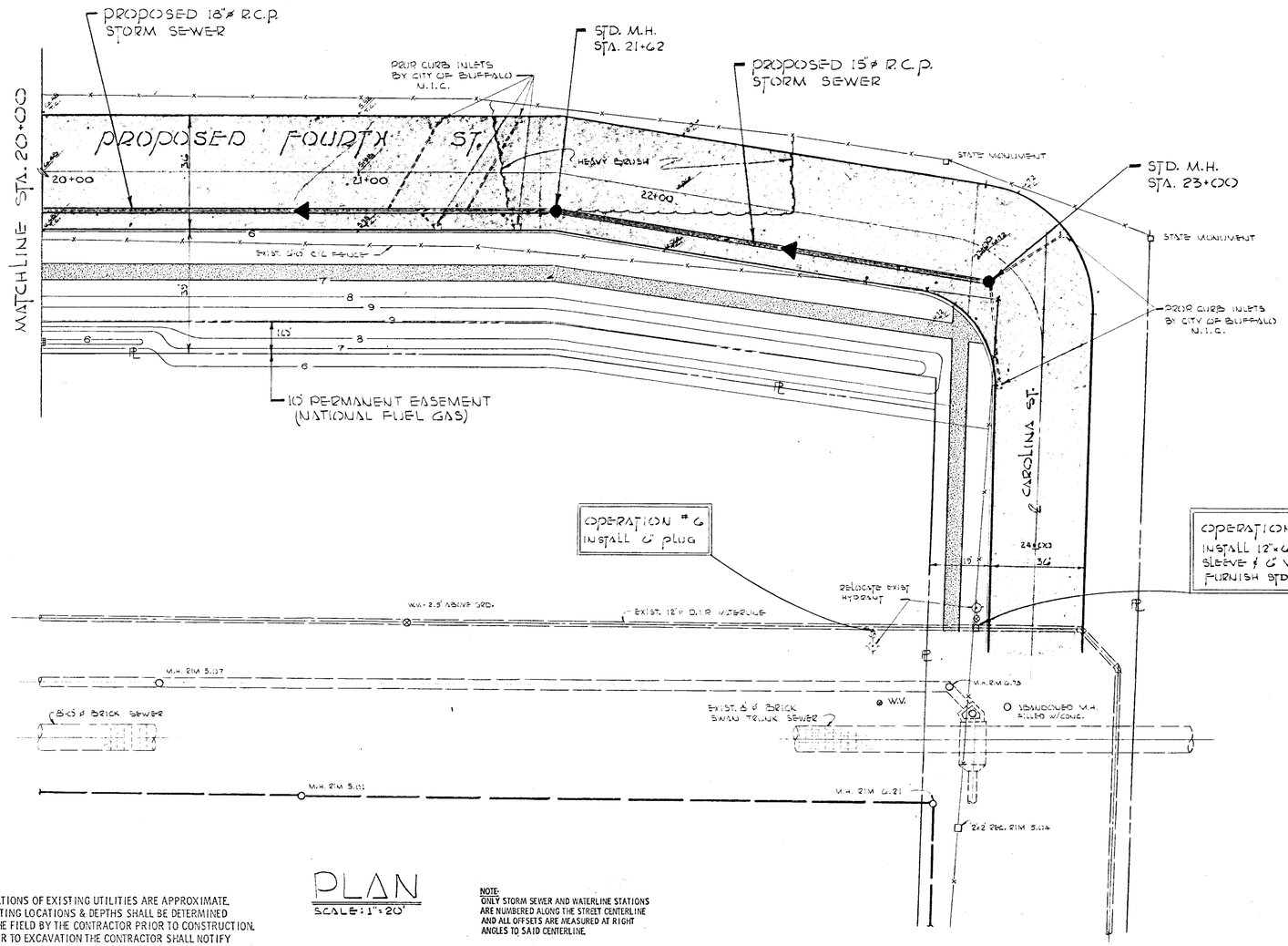
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER: STA. 15+00 TO 16+72 ; 16+80 TO 23+00
WATER LINE: STA. 15+00 TO 16+21 ; 0+00"C" TO 2+12"C"

SHEET NO. 10 OF 16

~ NIAGARA SECTION ~
NEW YORK STATE THRUWAY



PLAN
SCALE: 1"=20'

NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE NO. 032
VITO CARUSO
PRESIDENT

BID SECTION "D"

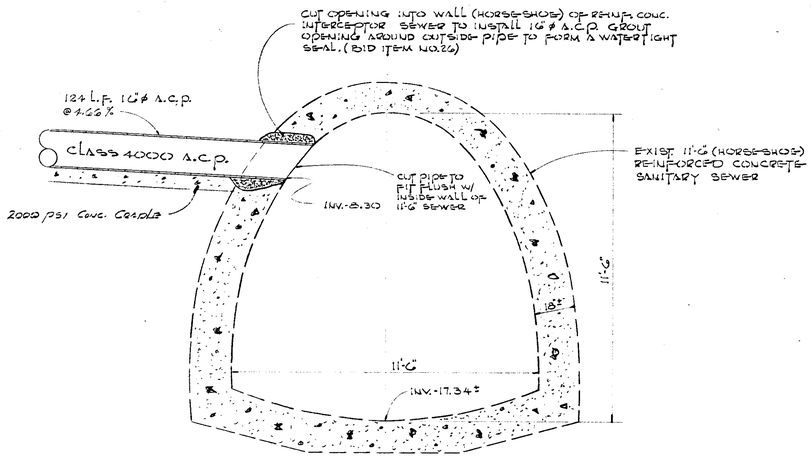
REVISIONS			DESIGNED BY: J.T.	CHECKED BY: J.T.
NO.	BY	DATE	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
1	J.P.V.	2-13-75	DATE: MAY 1975	SCALE: AS NOTED
			JOB NO. 68-149	REPORT NO.
			DRAWING NO. C-6627-11	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

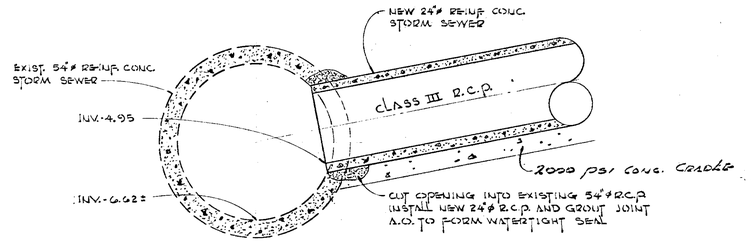
STORM SEWER: STA. 20+00 TO STA. 23+00

SHEET NO. 11 OF 16



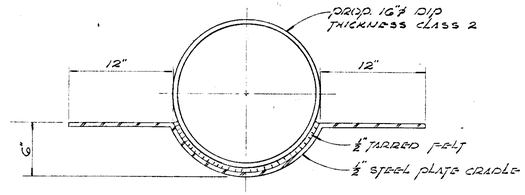
PROPOSED SANITARY SEWER CONNECTION TO EXISTING INTERCEPTOR SEWER @ STA. 1+24 "B"

scale: 3/8"=1'



PROPOSED STORM SEWER CONNECTION TO EXISTING 54"ø STORM SEWER @ STA. 0+28

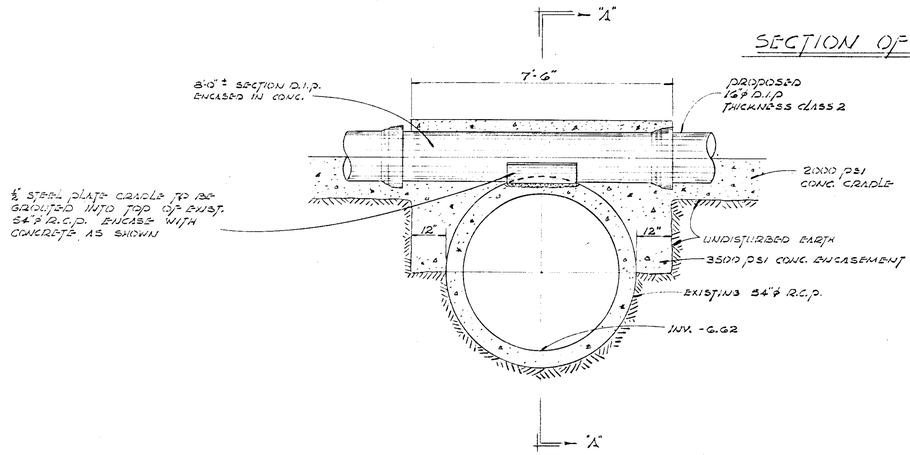
scale: 1/2"=1'



SHOP PAINT ALL EXPOSED CRADLE SURFACES WITH (1) COAT OF KOPPERS GSA TOXIC PRIMER SHOP COAT AND (2) COATS OF KOPPERS BITUMASTIC NO. 300-M

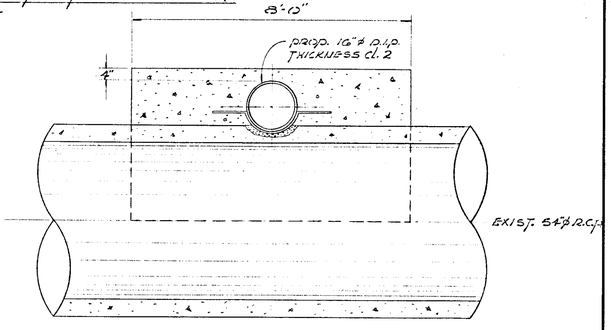
SECTION OF STEEL PLATE CRADLE

1½"=1'-0"



SECTIONAL VIEW

½"=1'-0"



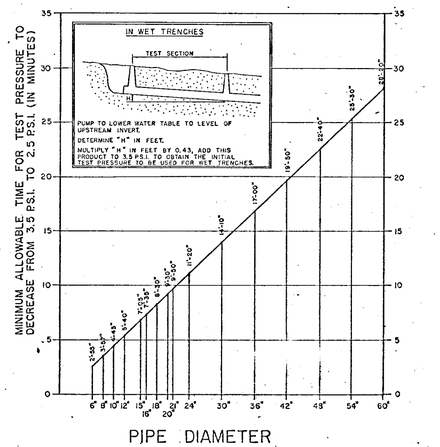
SECTION "A"-"A"

½"=1'-0"

CROSSING DETAIL AT STA. 1+98 "A"

ACCEPTABLE TESTING CURVE

(USING 3.5 P.S.I. INITIAL AIR PRESSURE)
(DRY TRENCHES)



NUSSBAUMER • CLARKE, INC. CONSULTING ENGINEERS BUFFALO, N.Y.

Vito Lamarca 627

BID SECTION "D"

REVISIONS		
NO.	BY	DATE
1	J.P.V.	5-15-75

DESIGNED BY: J.T.	CHECKED BY: J.T.
DRAWN BY: J.P.V.	CHECKED BY: R.H.M.
DATE: MAY 1975	SCALE: AS NOTED
JOB NO. 68-149	REPORT NO.
DRAWING NO. C-6627-16	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

MISCELLANEOUS DETAILS

SHEET NO. 16 OF 16

LIST OF DRAWINGS

BID SECTION 'E'

DWG. NO.	DESCRIPTION
1	TITLE SHEET
2	LIST OF DRAWINGS
3	PLAN: STA. 8+32 A TO STA. 10+00A STA. 0+00B TO STA. 2+82B STA. 0+00C TO STA. 0+63C
4	PLAN: STA. 10+00A TO STA. 15+00A STA. 2+82B TO STA. 7+74B STA. 0+00D TO STA. 0+80D
5	PLAN: STA. 15+00A TO STA. 17+74A
6	PROFILE: STA. 8+04A TO STA. 17+74A
7	PROFILE: STA. 0+00B TO STA. 7+74B STA. 0+00C TO STA. 0+63C STA. 0+00D TO STA. 0+80D
8	PLAN AND PROFILE WATER LINE: STA. 0+00W TO STA. 3+00W
9	STANDARD PRECAST MANHOLE DETAIL AND SPUR CONNECTION PIPE
10	MANHOLE FRAME AND COVER DETAILS
11	TRENCH DETAILS FOR SEWER AND WATER LINES
12	HYDRANT, VALVE AND TEE DETAILS; THRUST BLOCK DETAILS FOR WATER LINES
13	MISCELLANEOUS DETAILS
14	STORM CHAMBER DETAILS
15	STORM CHAMBER DETAIL AT STA. 8+32 A

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED FOR THE PRACTICE OF ENGINEERING IN THE STATE OF NEW YORK
SECRETARY
VITO RUSSO
PRESIDENT

REVISIONS						
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.	NUSSBAUMER & CLARKE, INC.	CITY OF BUFFALO, NEW YORK
			DRAWN BY: J.P.V.	CHECKED BY: R.N.M.	CONSULTING ENGINEERS	DEPARTMENT OF COMMUNITY DEVELOPMENT
			DATE: July 1973	SCALE: NONE	BUFFALO, NEW YORK	WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35
			JOB NO. 63-149	REPORT NO.		LIST OF DRAWINGS
			DRAWING NO. C6632-2			SHEET NO. 2 OF 15

COORDINATION OF WORK PROPOSED UNDER B.C. 3-73 WITH THE FORTHCOMING CONSTRUCTION OF THE SKYWAY TERMINUS:

1. THE WORK SITE LIES WITHIN THE LIMITS OF THE CHURCH STREET ARTERIAL HIGHWAY, ANY WORK PERFORMED WITHIN THE STREET BOUNDARIES IS SUBJECT TO A PERMIT OBTAINABLE FROM THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION AT 123 MAIN STREET, BUFFALO, NEW YORK.

2. ALL THRUWAY RAMP CONNECTIONS SHALL REMAIN OPEN TO TRAFFIC DURING CONSTRUCTION. THE CONTRACTOR SHALL SCHEDULE HIS WORK TO CONFORM TO THE REQUIREMENTS OF THE NEW YORK STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

3. SEWER TRENCH FOR THE REINFORCED CONCRETE PIPE ALONG CHURCH STREET
   a. REPLACE PAVEMENT IN KIND IN ALL RESURFACING AREAS.
   b. TEMPORARY PAVEMENT ALLOWED BETWEEN STA. 10+70A TO STA. 16+70A.

N

PROPOSED FOURTH ST.

W. GENESEE ST.

CHURCH ST.

MATCH LINE S

THRUWAY ON RAMP - N.B

THRUWAY ON RAMP - S.B

NIAGARA THRUWAY - S.B

NIAGARA THRUWAY - N.B

PROPOSED CHAMBER AT STA. 8+32 "A"
FOR DETAIL SEE SHT. NO. 15

REBUILD EXISTING MANHOLE AT STA. 0+00 "C"

PROPOSED 36"ø STORM SEWER TO REPLACE EXISTING 24" x 30" BRICK SEWER.

PROPOSED 10"ø SANITARY SEWER

PROPOSED MANHOLE AT STA. 1+67 "B"

PROPOSED MANHOLE AT STA. 0+63 "C"

PROPOSED 18"ø STORM SEWER

PROPOSED 30 L.F. OF STEEL SHEETING TO REMAIN IN PLACE

EXISTING CONCRETE PIERS

11-6" INTERCEPTOR SEWER

PAVEMENT BEGINS

EXISTING 24" SEWER

BULKHEAD SEE NOTE A

SEE NOTE A

STORM SEWER LINE C

STORM SEWER LINE A

SANITARY SEWER LINE B

BILLBOARD

PARKING LOT

PORTABLE CONC CURB

HYD TO REMAIN

CHAIN LINK FENCE

GRASS PS

OHSP

GRAVEL DR

CINDER DR

EXISTING 4' RAIL BRIDGE RAIL

6" DE RAIL

CONC PYLON

NOTE A

BULKHEAD AND ABANDON EXISTING SEWER (COST INCLUDED IN BID ITEM NO.1)
FILL ABANDONED SEWER WITH 1 TO 10 MIX CONCRETE BACKFILL (PAYMENT UNDER CONTINGENT ITEM U-3)
REMOVE MANHOLE FRAMES AND COVERS FROM ABANDONED MANHOLES AND DELIVER TO LOCATION TO BE DESIGNATED BY THE BUFFALO SEWER AUTHORITY.
FILL MANHOLES WITH 2" R.O.C. (PAYMENT UNDER BID ITEM NO. 6) AND PAVE DISTURBED AREAS TO LIMITS TO BE DETERMINED BY THE ENGINEER (PAYMENT UNDER BID ITEM NO. 7).

NOTE:

1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.

TO COORDINATE WORK PROPOSED UNDER THIS PROJECT WITH FUTURE HIGHWAY IMPROVEMENTS, THIS DRAWING IS BASICALLY A REPRODUCTION OF N.Y.S. DEPARTMENT OF TRANSPORTATION SHEET NO. UT-6 (SKYWAY TERMINUS).

INFORMATION PERTAINING TO "PROPOSED 10"ø SANITARY SEWER" AND "PROPOSED 36"ø STORM SEWER TO REPLACE EXISTING 24" x 30" BRICK SEWER, HAS BEEN ADDED BY N & C, INC.

NOTE: NUSSBAUMER & CLARKE, INC. DATUM AND CITY OF BUFFALO DATUM = 0.00
FOR N. Y. S. D. O. T. DATUM ADD 575.65

REVISIONS				
NO.	BY	DATE		
1	J.P.V.	9-15-75		

DESIGNED BY J.T.	CHECKED BY J.T.
DRAWN BY J.P.V.	CHECKED BY R.N.M.
DATE July 1975	SCALE 1"=20'
JOB NO. 68-149	REPORT NO.
DRAWING NO. C6632-3	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

BID SECTION "E"

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35
STORM SEWER PLAN: STA. 8+24 A TO STA. 10+00A
STORM SEWER PLAN: STA. 0+00C TO STA. 0+63C
SANITARY SEWER PLAN: STA. 0+00B TO STA. 2+82B

SHEET NO. 3 OF 15

PROPOSED 36"ø STORM SEWER TO REPLACE EXISTING 24" x 30" BRICK SEWER

PROPOSED CHAMBER AT STA. 13+85 A

COORDINATION OF WORK PROPOSED UNDER THIS SHEET WITH THE FORTHCOMING CONSTRUCTION OF THE SKYWAY TERMINUS:

1. THE WORK SITE LIES WITHIN THE LIMITS OF THE CHURCH STREET ARTERIAL HIGHWAY. ANY WORK PERFORMED WITHIN THE STREET BOUNDARIES IS SUBJECT TO A PERMIT OBTAINABLE FROM THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION AT 125 MAIN STREET, BUFFALO, NEW YORK.

2. ALL THRUWAY RAMP CONNECTIONS SHALL REMAIN OPEN TO TRAFFIC DURING CONSTRUCTION; THE CONTRACTOR SHALL SCHEDULE HIS WORK TO CONFORM TO THE REQUIREMENTS OF THE NEW YORK STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

3. SEWER TRENCH FOR THE REINFORCED CONCRETE PIPE ALONG CHURCH STREET

4. REPLACE PAVEMENT IN KIND IN ALL RESURFACING AREAS.

5. TEMPORARY PAVEMENT ALLOWED BETWEEN STA. 14+20A TO STA. 16+70A.

PROPOSED MANHOLE AT STA. 7+74 B

PROPOSED 10" ø SANITARY SEWER

PROPOSED MANHOLE AT STA. 4+31 B

PROPOSED MANHOLE AT STA. 0+80 D

PROPOSED 18" ø STORM SEWER

FACE OF ABUTMENT

NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.

TO COORDINATE WORK PROPOSED UNDER THIS PROJECT WITH FUTURE HIGHWAY IMPROVEMENTS, THIS DRAWING IS BASICALLY A REPRODUCTION OF N.Y.S. DEPARTMENT OF TRANSPORTATION SHEET NO. UT-2 (SKYWAY TERMINUS).

INFORMATION PERTAINING TO "PROPOSED 10"ø SANITARY SEWER" AND "PROPOSED 36"ø STORM SEWER TO REPLACE EXISTING 24" x 30" BRICK SEWER" HAS BEEN ADDED BY N & C, INC.

NOTE: NUSSBAUMER & CLARKE, INC.: DATUM AND CITY OF BUFFALO DATUM = 0.00
FOR N. Y. S. D. O. T. DATUM ADD 577.43

REVISIONS				
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.
1	J.P.V.	3-15-75	DRAWN BY: J.P.V.	CHECKED BY: R.W.M.
			DATE: July 1975	SCALE: 1"=20'
			JOB NO. 68-143	REPORT NO.
			DRAWING NO. C6632-4	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

BID SECTION "E"

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER PLAN: STA. 10+00 TO STA. 15+00A
STORM SEWER PLAN: STA. 0+00D TO STA. 0+80D
SANITARY SEWER PLAN: STA. 2+82B TO STA. 7+74B

SHEET NO. 4 OF 15

COORDINATION OF WORK PROPOSED UNDER C.P. 5X15 WITH THE CONTRACTING CONTRACTOR OF THE SKYWAY TERMINUS:

1. THE WORK SITE LIES WITHIN THE LIMITS OF THE CHURCH STREET ARTERIAL HIGHWAY. ANY WORK PERFORMED WITHIN THE STREET BOUNDARIES IS SUBJECT TO A PERMIT OBTAINABLE FROM THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION AT 125 MAIN STREET, BUFFALO, NEW YORK.

2. ALL THRUWAY RAMP CONNECTIONS SHALL REMAIN OPEN TO TRAFFIC DURING CONSTRUCTION. THE CONTRACTOR SHALL SCHEDULE HIS WORK TO CONFORM TO THE REQUIREMENTS OF THE NEW YORK STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

3. SEWER TRENCH FOR THE REINFORCED CONCRETE PIPE ALONG CHURCH STREET:
   a. REPLACE PAVEMENT IN KIND IN ALL RESURFACING AREAS.
   b. TEMPORARY PAVEMENT ALLOWED BETWEEN STA. 10+70A TO STA. 16+70A.

MATCH LINE C

MATCH LINE D

PROPOSED CHAMBER @ STA. 15+82 A

PROPOSED 30"ø STORM SEWER TO REPLACE EXISTING 24" x 30" BRICK SEWER

PROPOSED CHAMBER AT STA. 17+01 A

CONNECT NEW 30"ø STORM SEWER TO EXISTING CHAMBER STA. 17+74 A

MECHANIC ST.

ST. BDY.

GRAVEL DRIVE

CONC S.W.

LP & PP

OHS

OHSP

LP W/ OH POWER CONNECT

12" C.P.

18" R.C.P.

12" R.C.P.

12" V.C.P.

6" W

12" W

12" G

20" G

2" G

4" STD.

6" W WATER (ABANDONED)

6" W WATER MAIN

20" WATER MAIN

12" ASBESTOS CEMENT SEWER PIPE - SAN.

WATER DRIP

CONC. S.W.

HYD TO REMAIN

ST. BDY.

ERIE COUNTY HOLDING CENTER

20" ELM

18" ELM

WM

8'-0" BR. SEWER

QUARTZITE ROCK RETAINING WALL

BRUSH

E OF IMPROVEMENT

SC23

SC24

SC25

SC26

UT8

UT9

UT11

LT9

LT11

LT12

LOWER TERRACE

UPPER TERRACE

WOODEN PP

RIM 1537

(DH B33)

(DH B14)

T.S. SIGN

GUIDE POST

GUIDE SIGN

CHAIN LINK FENCE

13" - 35" PARAPET CONC.

EXISTING RETAINING WALL TO REMAIN

5" GRANITE CURB

SKYWAY

12"HPG

12" VT. SEWER

15" VT. SEWER

12" VT. LEAD

20" VT. STEAM

DI

CB

SMH

TMH

CMH

MH

SS

WGV

WMH

HPFSMH

HYD

DNE

SLS

PS

SP

POL EB

SIG PB

NEW PLANTER

CONC. DR.

RELOCATED HYD.

RELOCATED HYD.

NEW ERIE COUNTY HALL

DELAWARE AVENUE

GRASS

CONC S.W.

PH

12" R.C.P.

16"HP WATER (ABANDONED)

CHURCH STREET ARTERIAL

FAC 69-8

C 21+28

20" ST + SAN

12" R.C.P.

PAVEMENT ENDS STA. C 20+04

ASPH. PARKING LOT

W-BEAM GUIDE RAIL

SAND ST.

HYD TO REMAIN

2-WAY TRAF AHD

BPD

NYSTS

C 21

CONC S.W.

℄ AZ 104° 08' 30"

℄ AZ 104° 08' 30"

LT 12+50

STA. 10+70A

STA. 16+70A

STA. 15+00A

STA. 16+00A

STA. 17+00A

NOTE: NUSSBAUMER & CLARKE, INC. DATUM AND CITY OF BUFFALO DATUM = 0.00 FOR N.Y.S.D.O.T. DATUM ADD 575.43

NOTE:

1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.

TO COORDINATE WORK PROPOSED UNDER THIS PROJECT WITH FUTURE HIGHWAY IMPROVEMENTS, THIS DRAWING IS BASICALLY A REPRODUCTION OF N.Y.S. DEPARTMENT OF TRANSPORTATION SHEET NO. UI-4 (SKYWAY TERMINUS).

INFORMATION PERTAINING TO "PROPOSED 10"ø SANITARY SEWER" AND "PROPOSED 30"ø STORM SEWER TO REPLACE EXISTING 24", 30" BRICK SEWER" WAS ADDED BY N & C, INC.

REVISIONS			
NO.	BY	DATE	
1	J.P.V.	5-13-75	

DESIGNED BY: J.T. CHECKED BY: J.T.
DRAWN BY: J.P.V. CHECKED BY: R.U.M.
DATE: July 1975 SCALE: 1"=20'
JOB NO. 68-149 REPORT NO.
DRAWING NO. C6632-5

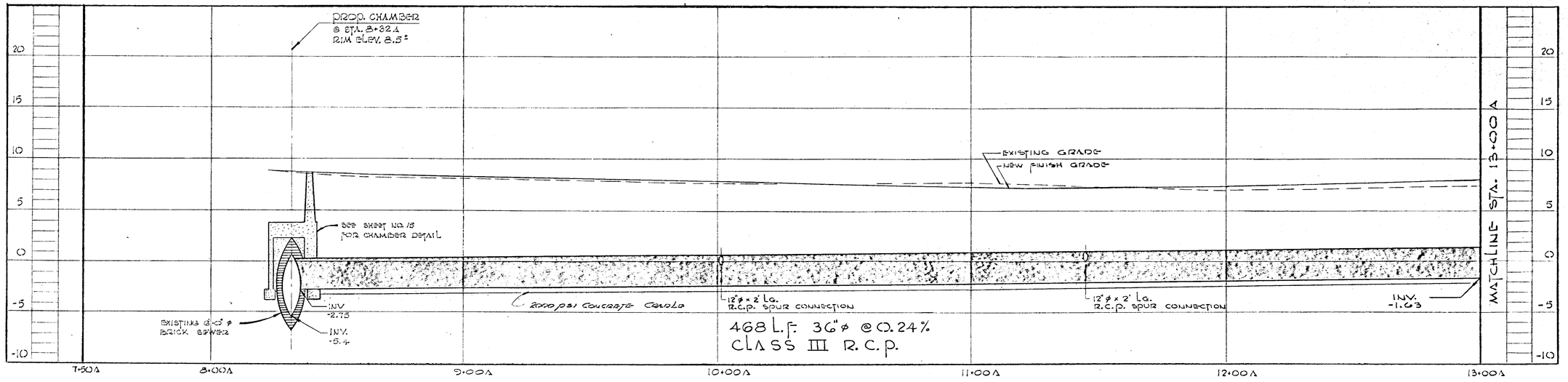
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

BID SECTION "E"

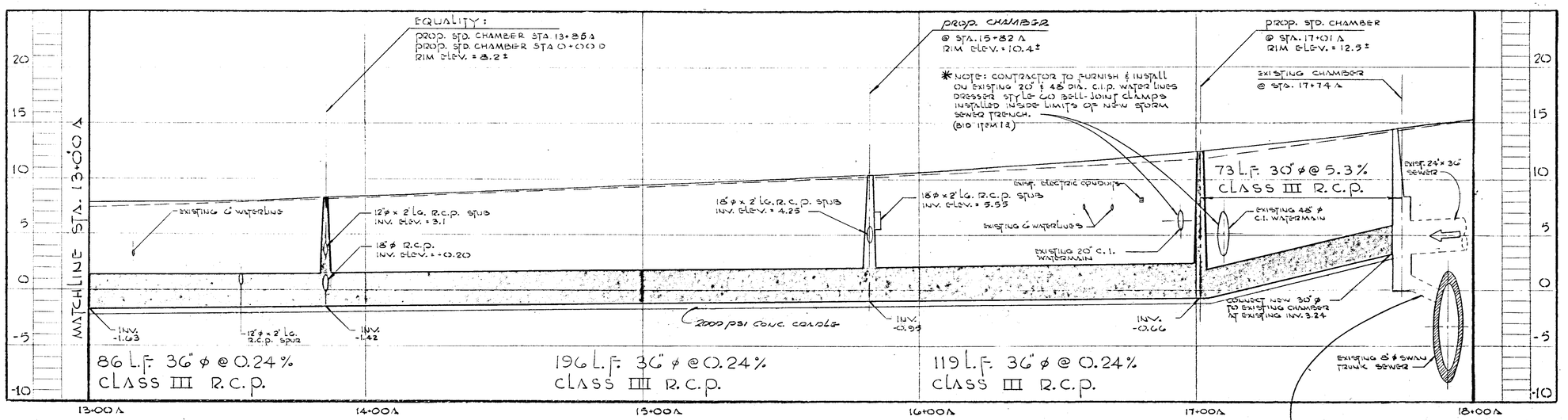
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R-35

STORM SEWER PLAN: STA. 15+00 TO STA. 17+74A

SHEET NO. 5 OF 15



PROFILE – STORM SEWER
STA. 7+50 Δ TO STA. 13+00 Δ



PROFILE – STORM SEWER
STA. 13+00 Δ TO STA. 18+00 Δ

NUSSBAUMER & CLARKE, INC.
A CORPORATION LICENSED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE NO. _____
V. D. CARUSO
PRESIDENT

BID SECTION "E"

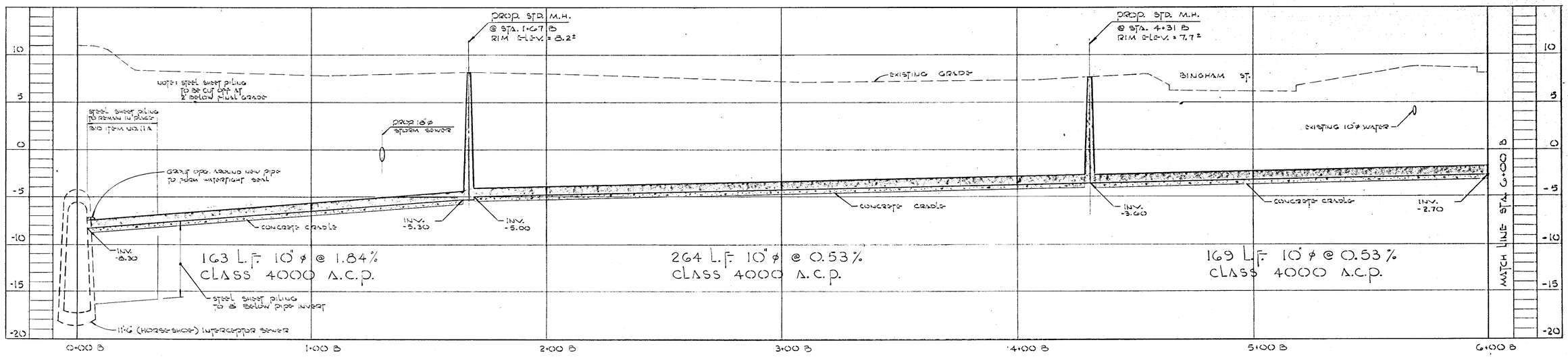
REVISIONS					
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.	
1	J.P.V.	9-15-75	DRAWN BY: J.P.V.	CHECKED BY: R.V.M.	
			DATE: July 1975	SCALE: HOR. 1"=20' VERT. 1"=3'	
			JOB NO. 68-149	REPORT NO.	
			DRAWING NO. C6632-6		

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

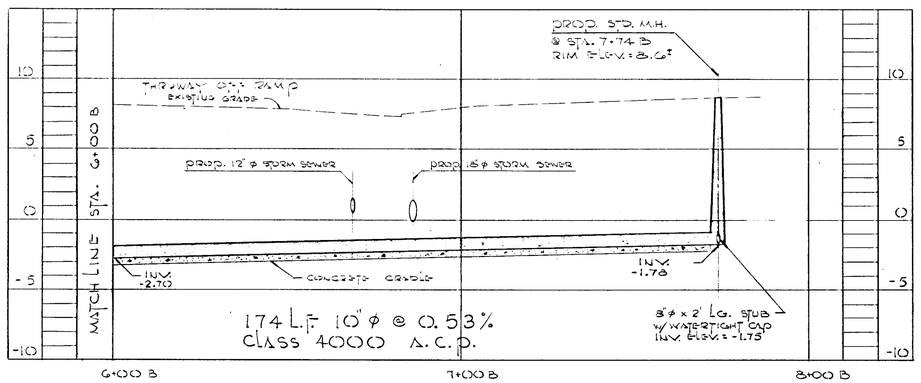
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER PROFILE: STA. 8+32 A TO STA. 17+74 A

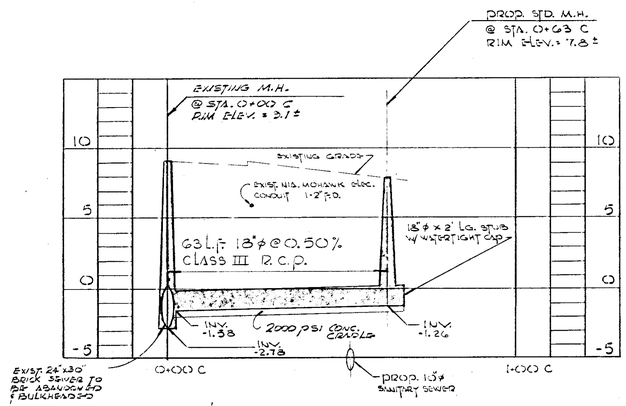
SHEET NO. 6 OF 15



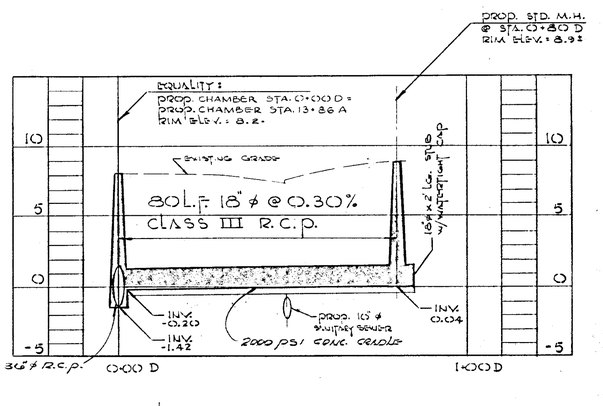
PROFILE - SANITARY SEWER
STA. 0+00 B TO STA. 6+00 B



PROFILE - SANITARY SEWER
STA. 6+00 B TO STA. 8+00 B



PROFILE - STORM SEWER
LINE "C"



PROFILE - STORM SEWER
LINE "D"

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE NO. _____
W. T. CAPUSO
PRESIDENT

BID SECTION "E"

REVISIONS			DESIGNED BY: J.T.	CHECKED BY: J.T.
NO.	BY	DATE	DRAWN BY: J.P.M.	CHECKED BY: R.N.M.
1	J.P.M.	3-15-75	DATE: July 1975	SCALE: HOR. 1"=20' VERT. 1"=3'
			JOB NO. 68-143	REPORT NO.
			DRAWING NO. C6632-7	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, N.Y.
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT N.Y.R.-35
STORM SEWER PROFILE: STA. 0+00C TO STA. 0+63C
STORM SEWER PROFILE: STA. 0+00D TO STA. 0+80D
SANITARY SEWER PROFILE: STA. 0+00B TO STA. 7+74B

SHEET NO. 7 OF 15

OPERATION #7
REMOVE REDUCER
OPEN, CLOSE &
OPEN VALVE

EXISTING WATER MANHOLE
STA. 0+34 W

EXISTING WATER MANHOLE
STA. 1+31 W

EXIST WATER MANHOLE
STA. 2+27 W

proposed 16" ϕ D.I.P.
WATERLINE (BID SECT. "D")

proposed water valves

proposed 12" ϕ D.I.P.
WATER LINE (BID SECT. "D")

EXISTING 6" ϕ C.I.P.
WATER LINE TO BE ABANDONED

proposed 24" ϕ R.C.P.
STORM SEWER (BID SECT. "D")

proposed 12"
WATER VALVE
(BID SECT. "D")

proposed 18" ϕ R.C.P.
STORM SEWER (BID SECT. "D")

existing 7'-1" ϕ
INTERCEPTING SEWER

EXISTING 6'-0" ϕ R.C.P. STORM SEWER

PROPOSED FOURTH STREET

NEW YORK STATE THRUWAY

EDGE OF MAIN LINE THRUWAY

RETAINING WALL

RAILROAD

CENTRAL

PENN

EXISTING DITCH

EXISTING D.I.
STA. 1+03.93

M.H.O

ABANDONED
SIGNAL BLDG.

HEADWALL

exist. 48" ϕ D.I.P. water line

exist. 48"x16" cross w/
2-16" butterfly valves

exist. 48" butterfly valve & valve vault

OPERATION #8
OPEN, CLOSE &
OPEN VALVE

proposed 16" ϕ D.I.P. water line
proposed 16"x12"x16" tee

exist. 6" C.I.P. water line (abandoned)
proposed 16" butterfly valve w/ 16"x6" reducer
proposed 6" hydrant
proposed 12" butterfly valve

PLAN
SCALE: 1"=20'

EXIST. WATER M.H.
STA. 0+34 W

NEW YORK STATE THRUWAY

EXIST. WATER M.H.
STA. 1+31 W

EXIST. WATER M.H.
STA. 2+27 W

EXISTING RETAINING WALL

EXISTING 18" ϕ OPENING IN M.H. WALL TO PULL NEW PIPE THRU

45° BEND

12" VALVE

BRACE @ 90° BEND

BRACE @ 90° BEND

EXISTING 42" ϕ R.C.P. TO REMAIN
PLACE NEW CONC. SADDLES UNDER EACH PIPE JOINT

BRACE @ 90° BEND

BRACE @ MID POINT

BRACE @ 90° BEND

EXISTING 42" ϕ R.C.P. CASING TO REMAIN
PLACE NEW CONC. SADDLES UNDER EACH PIPE JOINT

PROPOSED 12" ϕ D.I.P. WATER LINE (BID SECT. "D")

EXISTING 6'-6" R.C.P. STORM SEWER

EXISTING 11'-6" INTERCEPTING SEWER

PENN CENTRAL RAIL ROAD

prop. 12" butterfly valve
prop. 16"x12" reducing
exist. 16" valve
exist. 16" ϕ D.I.P. waterline

REMOVE EXIST. 6" C.I.P. WATER LINE

*12" ϕ WATER LINE W/MECHANICAL JOINT ANCHORING FITTING'S
A.S.A. THICKNESS CLASS 2 DUCTILE IRON PIPE
(THICKNESS 0.37)

16" ϕ WATER LINE W/MECHANICAL JOINT ANCHORING FITTINGS
A.S.A. THICKNESS CLASS 2 DUCTILE IRON PIPE
(THICKNESS 0.40)

15
10
5
0
-5
-10
-15
-20

0+00 W
1+00 W
2+00 W
3+00 W

PROFILE
SCALE: HOR. 1" = 20'
VERT. 1" = 5'

ALL NEW 12" WATER PIPE & FITTINGS TO BE MECHANICAL JOINT DUCTILE IRON ANCHORING PIPE FURNISHED WITH A ROTO-RING GLAND AND SOLID SLEEVE AT JOINTS.
PIPE TO BE ORDERED TO EXACT LENGTH.

*NOTE: REMOVE EXISTING 6" C.I.P. WATERLINE PRIOR TO INSTALLING NEW 12" D.I.P.

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE NO. _____
VITO CARUSO
VICE PRESIDENT

BID SECTION "E"

NOTE:

1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.

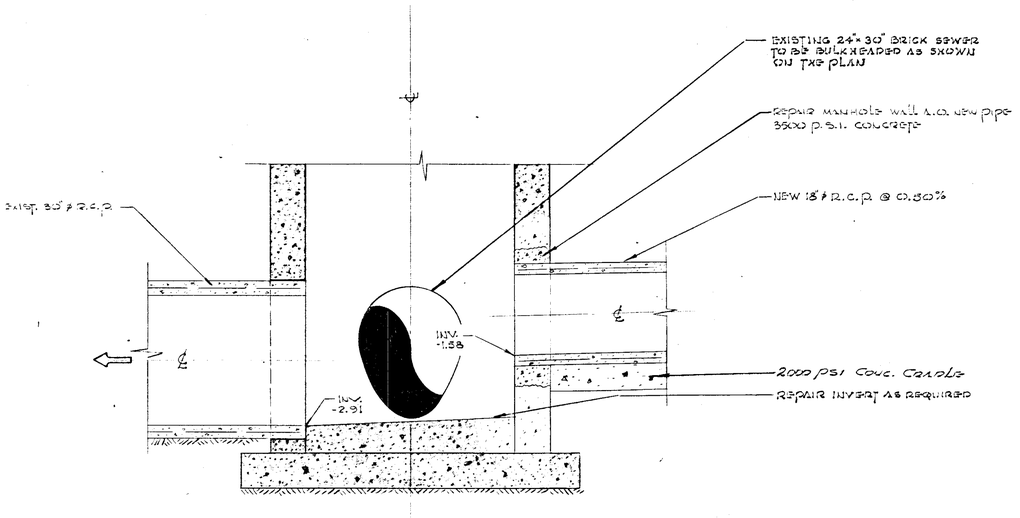
NOTE: NUSSBAUMER & CLARKE, INC. DATUM AND CITY OF BUFFALO DATUM = 0.00
FOR N. Y. S. D. O. T. DATUM ADD 373.45

REVISIONS				
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.
1	J.P.V.	9-15-75	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
			DATE: JULY 1975	SCALE: AS NOTED
			JOB NO. 68-143	REPORT NO.
			DRAWING NO. C6632-8	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

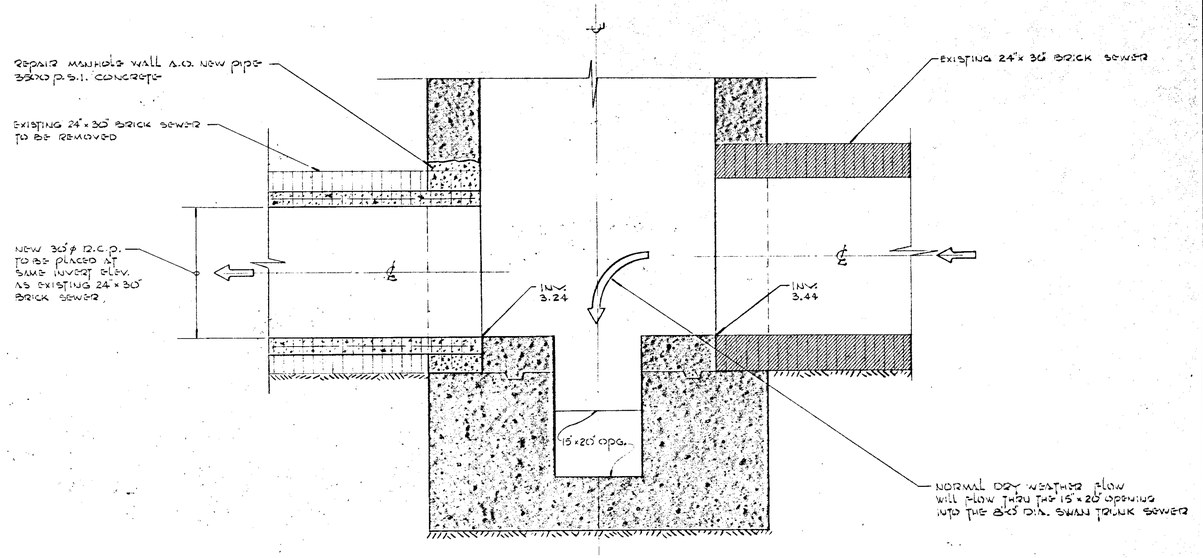
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R-35
WATER LINE PLAN & PROFILE
STA. 0+00W TO STA. 3+00W

SHEET NO. 8 OF 15



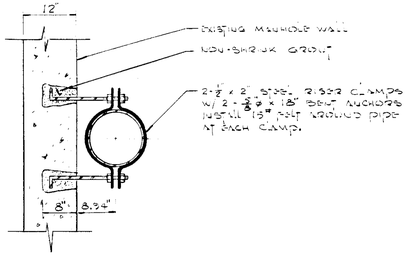
① EXISTING MANHOLE @ STA. 0+00 "C"
W/ NEW 18" ϕ R.C.P. INLET

scale: 3/4" = 1'-0"

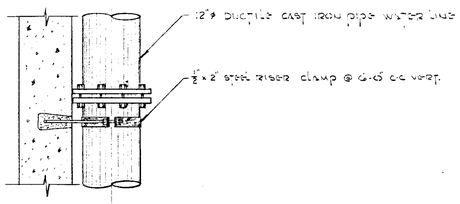


EXISTING CHAMBER @ STA. 17+74Δ
W/ NEW 30" ϕ R.C.P. OUTLET

scale: 3/4" = 1'-0"



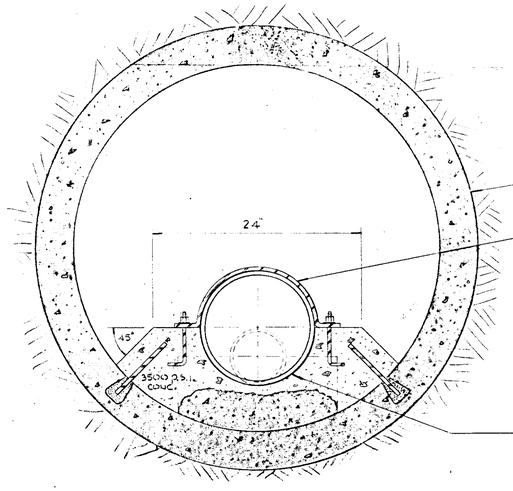
PLAN



ELEVATION

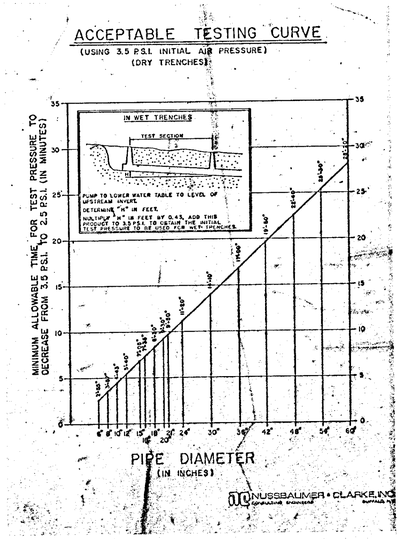
HORIZONTAL BRACING DETAIL
@ WATER MANHOLES

scale: 3/4" = 1'-0"



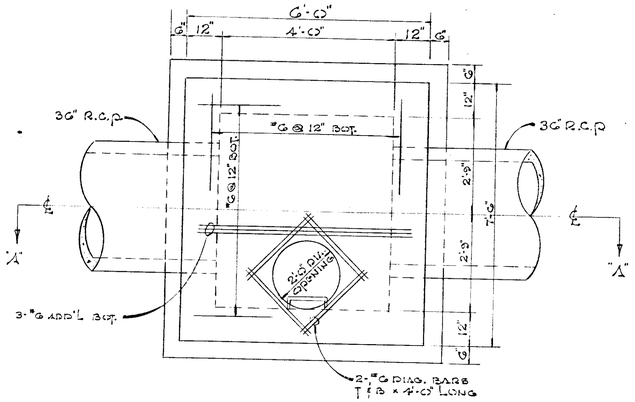
VERTICAL BRACING DETAIL
FOR NEW 12" ϕ WATER LINE
IN EXISTING 42" ϕ R.C.P. CASING

scale: 1-1/2" = 1'-0"

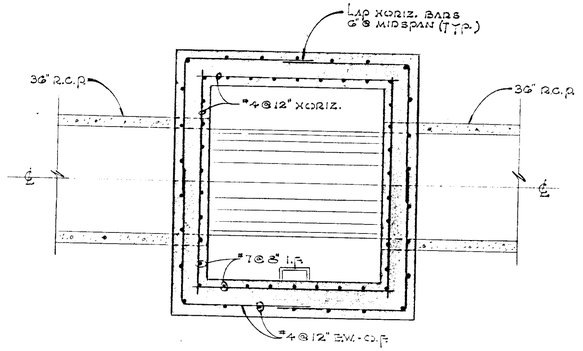


BID SECTION "E"

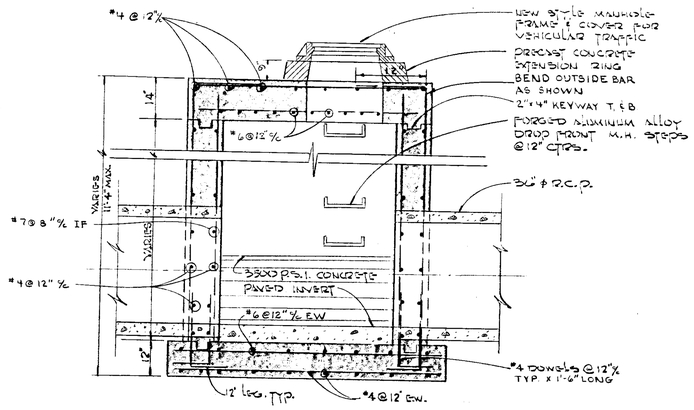
REVISIONS			DESIGNED BY: J.T.	CHECKED BY: J.T.	NUSSBAUMER & CLARKE, INC. CONSULTING ENGINEERS BUFFALO, NEW YORK	CITY OF BUFFALO, NEW YORK DEPARTMENT OF COMMUNITY DEVELOPMENT WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R-35 - MISCELLANEOUS DETAILS	SHEET NO. 13 OF 15
NO.	BY	DATE	DRAWN BY: LPV.	CHECKED BY: R.N.M.			
1	JPV	9-15-75	DATE: July 1975	SCALE: AS NOTED			
			JOB NO. 68-149	REPORT NO.			
			DRAWING NO. C6632-13				



ROOF PLAN



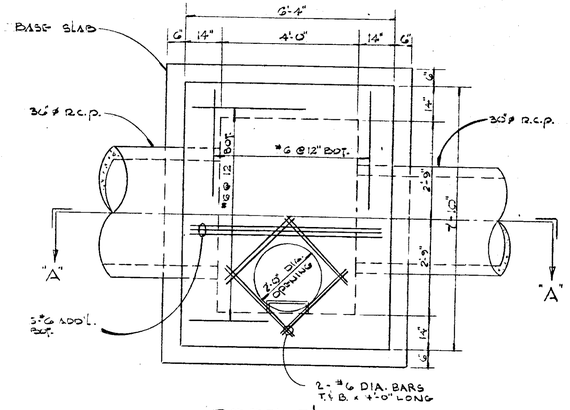
SECTIONAL PLAN



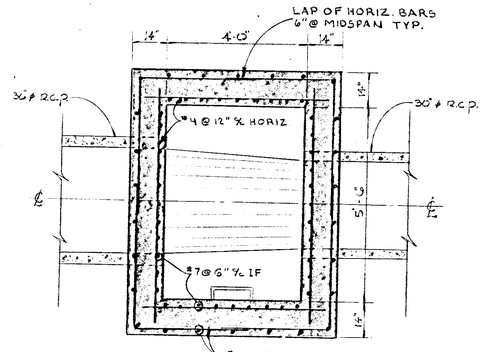
SECTION "A-A"

STORM CHAMBER @ STA. 13+86 "A"

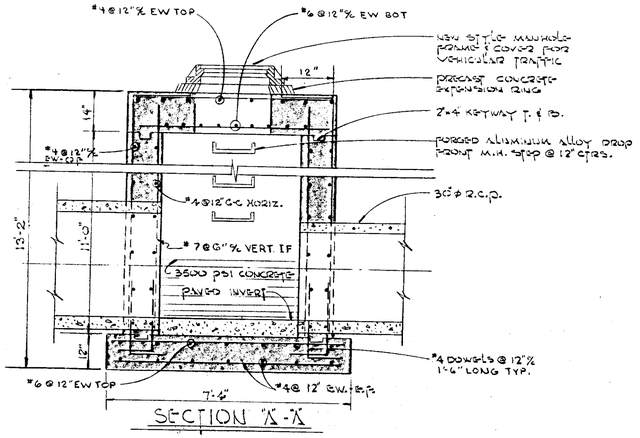
SCALE: 1/2" = 1 FT.



ROOF PLAN



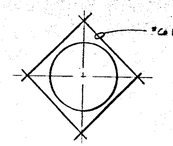
SECTIONAL PLAN



SECTION "A-A"

STD. STORM CHAMBER @ STA. 17+01 "A".

SCALE: 1/2" = 1 FT.



WALL REINFORCEMENT AT PIPE OPENING

RE-STEEL COVER

2" TOP OF ROOF SLAB & BASE SLAB
1½" BOTTOM OF ROOF SLAB
3" BOTTOM OF BASE SLAB
2" WALLS

NUSSBAUMER & CLARKE, INC.
A CORPORATION REGISTERED TO PRACTICE PROFESSIONAL ENGINEERING IN THE STATE OF NEW YORK
CERTIFICATE NO. 027
PRESIDENT

REVISIONS					
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.	
1	J.P.V.	9-15-75	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.	
			DATE: JULY 1975	SCALE: AS NOTED	
			JOB NO. 63-149	REPORT NO.	
			DRAWING NO. C-6632-14		

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

BID SECTION "E"
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM CHAMBER DETAILS

SHEET NO. 14 OF 15

CITY OF BUFFALO

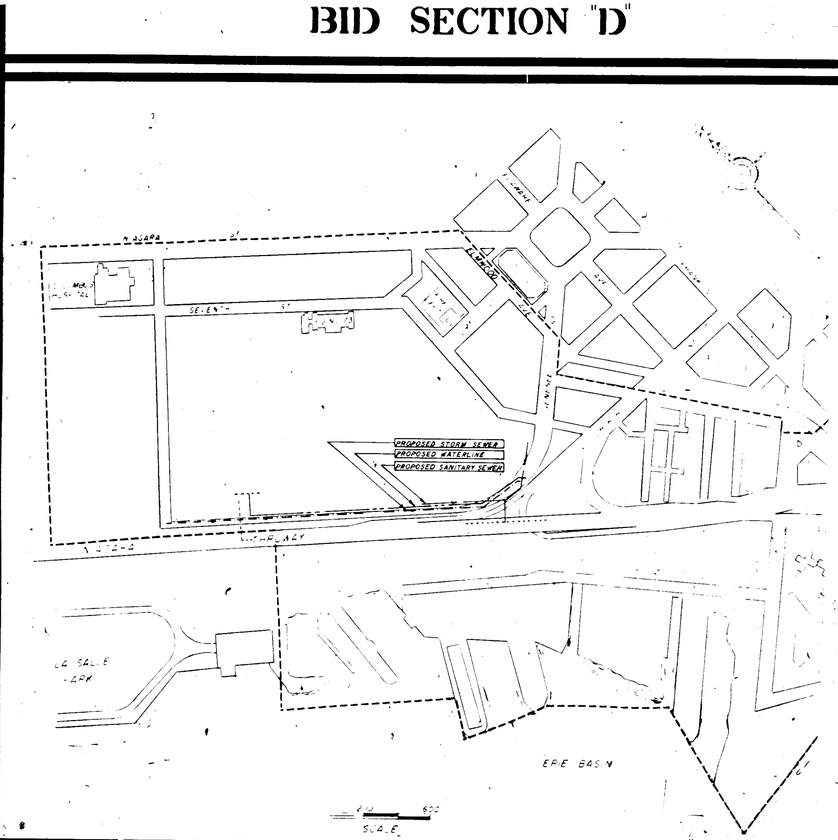
DEPARTMENT OF COMMUNITY DEVELOPMENT

WATERFRONT REDEVELOPMENT PROJECT NO. N.Y. R-35

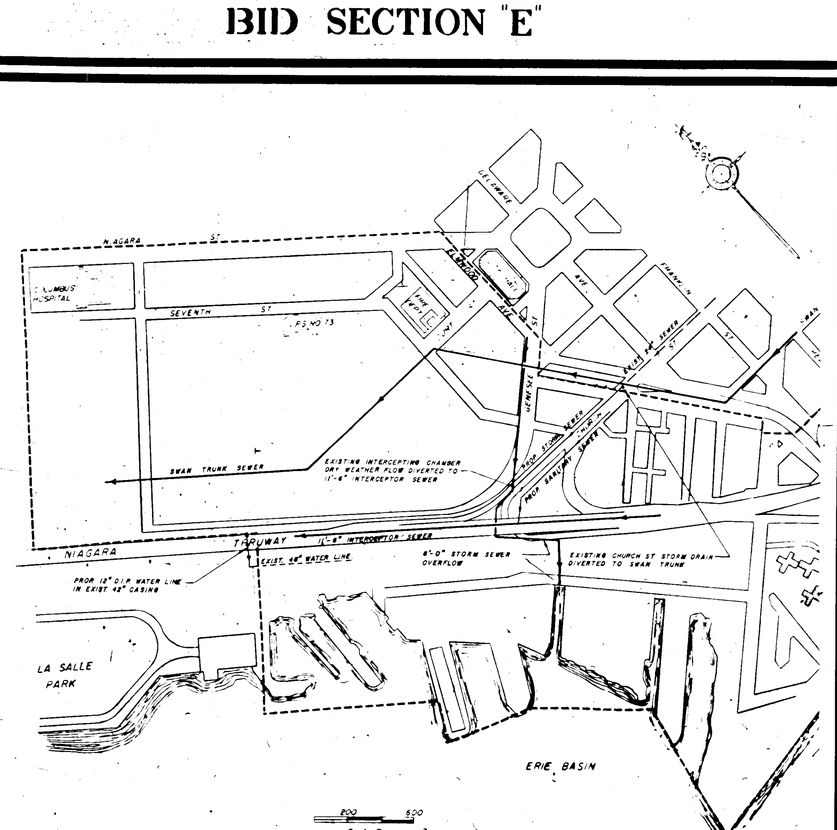
UTILITY REPLACEMENT CONTRACT

1975

BID SECTION "D"



BID SECTION "E"



PREPARED AND RECOMMENDED BY
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS

DATE 7/16/75
Vito J Caruso, P.E.
Certificate No 027

CITY OF BUFFALO

APPROVED

DATE 10/11/75
Mayor Stanley M. Makowski

DATE 8/30/75
Richard L. Miller
Commissioner
Department of Community Development

DATE
Gilman J Laehy, P.E.
General Manager
Buffalo Sewer Authority

MARIN CONCRETE CO.

STATE OF NEW YORK
EDWARD DREW HUBBELL
No. 035609
LICENSED LAND SURVEYOR
August 6, 1976
AS BUILT

NUSSBAUMER & CLARKE, INC.
ENGINEERS, SURVEYORS
310 DELAWARE AVENUE BUFFALO, NEW YORK.

S4376D

LIST OF DRAWINGS

BID SECTION "D"

DWG. NO.	DESCRIPTION
1	TITLE SHEET
2	LIST OF DRAWINGS
3	PLAN: STA. -0+46 TO STA. 5+00 STA. 1+69 "A" TO STA. 6+68 "A" STA. 0+00 "B" TO STA. 1+24 "B"
4	PROFILE: STA. -0+46 TO STA. 5+00 STA. 0+00 "A" TO STA. 6+00 "A"
5	PLAN: STA. 5+00 TO STA. 10+00 STA. 6+68 "A" TO STA. 8+24 "A"
6	PROFILE: STA. 5+00 TO STA. 10+00 STA. 6+00 "A" TO STA. 8+24 "A" STA. 0+00 "B" TO STA. 1+24 "B"
7	PLAN: STA. 10+00 TO STA. 15+00
8	PROFILE: STA. 10+00 TO STA. 15+00
9	PLAN: STA. 15+00 TO STA. 20+00 STA. 0+00 "C" TO STA. 2+12 "C"
10	PROFILE: STA. 15+00 TO STA. 23+00 STA. 0+00 "C" TO STA. 2+12 "C"
11	PLAN: STA. 20+00 TO STA. 23+00
12	HYDRANT, VALVE & TEE DETAILS; THRUST BLOCK DETAILS FOR WATERLINES
13	STANDARD PRECAST MANHOLE DETAIL & SPUR CONNECTION PIPE
14	MANHOLE FRAME & COVER DETAILS
15	TRENCH DETAILS FOR SEWER AND WATER LINES
16	MISCELLANEOUS DETAILS

MARIN CONCRETE CO.

STATE OF NEW YORK
LEWIS DREW MOYER
No. 035698
LICENSED LAND SURVEYOR

August 6, 1976
As Built

027

REVISIONS				
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.
1	J.P.V.	9-15-75	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
			DATE: MAY 1975	SCALE: NONE
			JOB NO. 68-149	REPORT NO.
			DRAWING NO. C-6627-2	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

LIST OF DRAWINGS

SHEET NO. 2 OF 16

S4376D

OPERATION # 1
INSTALL 10" VALVE
FURNISH STD. VALVE BOX COMPL.

PRIOR TO ANY SEWER CONSTRUCTION EXCAVATE TO VERIFY FEASIBILITY OF PROPOSED CONNECTION

ON RAMP TXRUWAY SOUTH BOUND

ON RAMP TXRUWAY NORTH BOUND

FUTURE CHURCH ST. CONNECTION BY N.Y.S. DOT.

EXIST. 24"-30" BRICK SEWER

15"U.C.P. SEWER TO BE ABANDONED SEE NOTE A

EXIST. 54" ø R.C.P. STORM SEWER

EXIST. 10"-10" CROSS TO REMAIN

SEE NOTE A

45° BEND

STD. M.H. STA. 1+76 1/2

STD. M.H. STA. 0+50

EXIST. 238.5' 24" R.C.P. @ 0.07% STORM SEWER

STD. M.H. STA. 2+88.5

proposed FOURTH ST.

EXIST. 11'-6" ø SANITARY SEWER

EXIST. CONC. PIERS

EXIST. 8'-0" ø STORM SEWER

EXIST. CONC. RETAINING WALL

1+00

2+00

3+00

4+00

5+00

EXIST. HYDRANT - 10"x6" TEE & BUTTERFLY VALVE - STD VALVE BOX STA. 0+42

EXIST. 10" D.I.P. WATERLINE

48° BEND

231.5 @ 0.15% 16" A.C.P. SANITARY SEWER

STD. MH STA. 4+63 1/2

STD. MH STA. 2+31.5

STD. MH STA. 1+99.5 1/2

EXISTING 15" V.T. TO BE ABANDONED

10' PERMANENT EASEMENT (NATIONAL FUEL GAS)

NATIONAL FUEL GAS

W. GENESEE ST.

GRAVEL DRIVE

EXIST. 15.5'-16' x 10' P.C.P. @ 0.0% SLOPE

EXIST. BRICK SEWER

LIMIT OF WORK FOR S.D. 'A'

PROVIDE 6" ø STUB & C.I. FOR FUTURE CONNECTION IN STALL WATERTIGHT CAP N.Y.-I.T.I.

EXISTING D.I.D. THICKNESS CLASS 2. REPAIR SHEET NO. 16 FOR 54" R.C.P. CROSSING DETAIL

PLAN
SCALE: 1"=20'

NOTE A

BULKHEAD AND ABANDON EXISTING SEWER (COST INCLUDED IN BID ITEM NO. 1) FILL ABANDONED SEWER WITH 1 TO 10 MIX CONCRETE BACKFILL (PAYMENT UNDER CONTINGENT ITEM U-8)
REMOVE MANHOLE FRAMES AND COVERS FROM ABANDONED MANHOLES AND DELIVER TO LOCATION TO BE DESIGNATED BY THE BUFFALO SEWER AUTHORITY.
FILL MANHOLES WITH 2" R.O.C. (PAYMENT UNDER BID ITEM NO. 6) AND PAVE DISTURBED AREAS TO LIMITS TO BE DETERMINED BY THE ENGINEER (PAYMENT UNDER BID ITEM NO. 7).

PRIOR TO ANY SEWER CONSTRUCTION EXCAVATE TO VERIFY FEASIBILITY OF PROPOSED CONNECTION

NIAGARA SECTION N.Y.S. THRUWAY ABOVE

STEEL ENCASING THIS SECTION OF PIPE INCLUDED IN BID'S PRICE

EXIST. 11'-6" ø SANITARY SEWER

ON RAMP TXRUWAY NORTH BOUND

3.0'

EDGE OF CONC. ABUTMENT

EXIST. CONC. RETAINING WALL

PROPOSED 18" ø R.C.P. STORM SEWER

PROPOSED 16" A.C.P. SANITARY SEWER

proposed FOURTH ST.

MATCH LINE STA. 3+00

MATCH LINE STA. 5+00

3+00

4+00

5+00

HYDRANT - 10"x6" TEE & BUTTERFLY VALVE - STD VALVE BOX STA. 3+30

PROPOSED 10" D.I.P. WATERLINE

10' PERMANENT EASEMENT (NATIONAL FUEL GAS)

PROPOSED 16" A.C.P. SANITARY SEWER

PROP. 8" A.C.P. SANITARY SEWER

EQUALITY: STD. MH STA. 3+87 1/2 = STD. MH STA. 0+00 B

PLAN
SCALE: 1"=20'

MARIN CONCRETE CO.

AS BUILT SURVEY
August 6, 1976

ELWOOD D. HUMMEL
LICENSED SURVEYOR 035608
341 SOUTH ST. EAST AURORA, N.Y. 14052

NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

WATERLINE NOTES
1. OPERATIONS LISTED #1 to #7 INCLUSIVE WILL BE DONE BY THE CITY OF BUFFALO WATER DEPARTMENT.
2. EXCAVATION, BACKFILLING AND ALL OTHER NECESSARY WORK TO PERFORM THESE OPERATIONS WILL BE DONE BY THE CONTRACTOR.
3. THE CONTRACTOR WILL REIMBURSE THE CITY OF BUFFALO WATER DEPARTMENT FOR THEIR ENTIRE COST OF THESE OPERATIONS, AND SHALL INCLUDE THIS COST IN THE BID PRICES.

BID SECTION "D"

REVISIONS				
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.
1	J.P.V.	3-13-75	DRAWN BY: J.P.V.	CHECKED BY: R.U.M.
			DATE: MAY 1975	SCALE: AS NOTED
			JOB NO. 68-149	REPORT NO.
			DRAWING NO. C-6627-3	

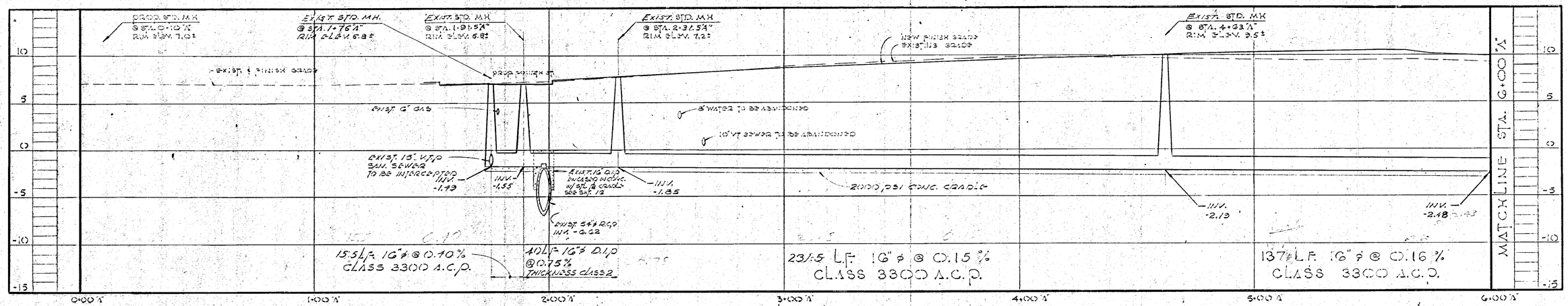
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

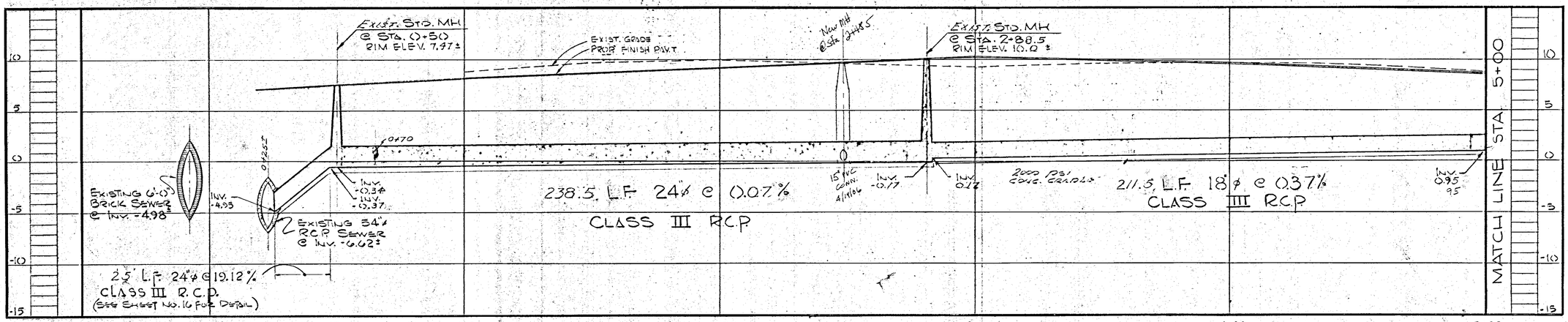
SANITARY SEWER: STA. 1+69"A" TO 6+68"A"; 0+00"B" TO 1+24"B"
STORM SEWER: STA. 0+28 TO STA. 5+00
WATER LINE: STA. -0+46 TO STA. 5+00

SHEET NO. 3 OF 16

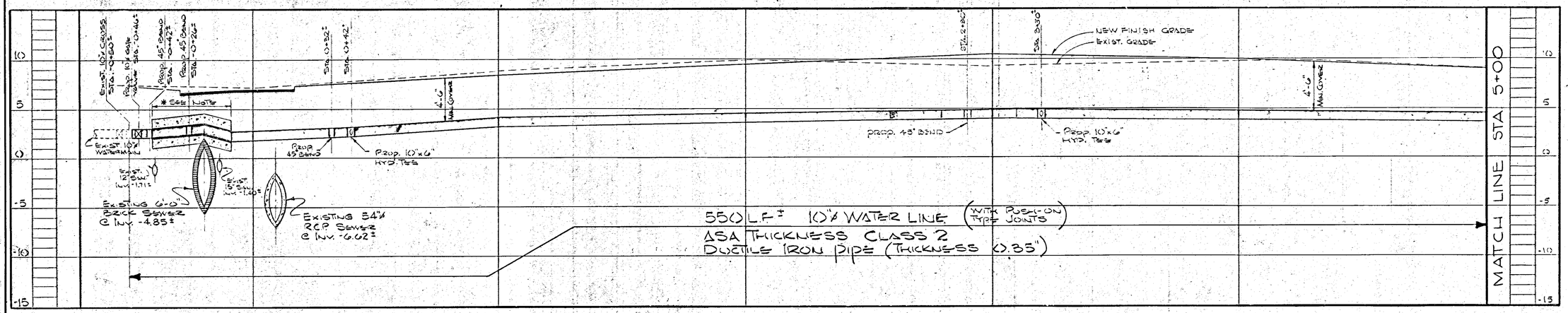
S4376D



SANITARY SEWER PROFILE - LINE "A"



STORM SEWER PROFILE



WATER LINE PROFILE

* NOTE:
PROVIDE INSULATION, WATERTIGHT WRAPPING AND CONCRETE ENCASEMENT STATION -0+09± TO STATION -0+41±

NOTE:
BACKFILL WITH SELECT MATERIAL TRENCHED IN EXISTING AND PROPOSED PAVEMENT AREAS

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

MARIN CONCRETE CO.
Dennis Murphy

AS BUILT SURVEY
AUGUST 6, 1975

ELWOOD D. HUMMEL
LICENSED SURVEYOR 035609
341 SOUTH ST. EAST AURORA, N.Y. 14052

NUSSBAUMER & CLARKE, INC.
A CORPORATION DULY LICENSED TO PRACTICE PROFESSIONAL ENGINEERING AND LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE NO. 057

REVISIONS		
NO.	BY	DATE
1	J.P.V.	3-15-76

DESIGNED BY: J.T.	CHECKED BY: J.T.
DRAWN BY: R.M./J.V.	CHECKED BY: R.J.N.M.
DATE: MAY 1975	SCALE: HOR: 1"=20' VERT: 1"=5'
JOB NO. 68-149	REPORT NO.
DRAWING NO. C-6627-4	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

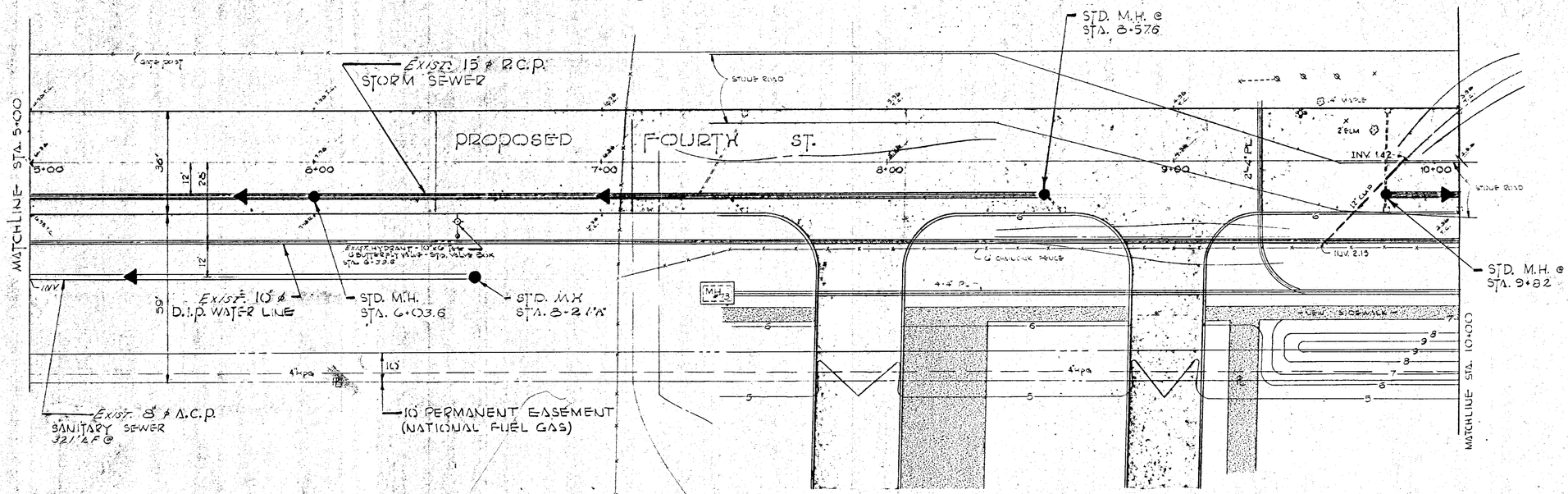
BID SECTION "D"
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

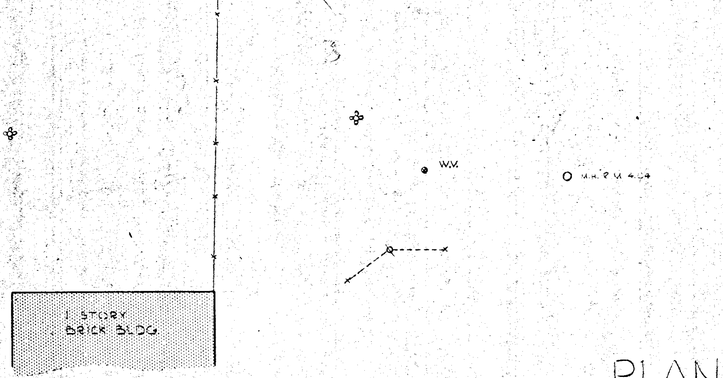
SANITARY SEWER: STA. 0+00 "A" TO STA. 6+00 "A"
STORM SEWER: STA. 0+28 TO STA. 5+00
WATER LINE: STA. -0+46 TO STA. 5+00

SHEET NO. 4 OF 16

S4376D

NIAGARA SECTION
NEW YORK STATE THRUWAY





PLAN
SCALE 1"=20'

NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

MARIN CONCRETE CO.

AS BUILT SURVEY.
AUGUST 6, 1976

ELWOOD D. HUMMEL
LICENSED SURVEYOR 035409
341 SOUTH ST. - EAST AURORA, N.Y. 14052

NUSSBAUMER & CLARKE, INC.

CER

BID SECTION "D"

REVISIONS			DESIGNED BY: J.T.	CHECKED BY: J.T.
NO.	BY	DATE	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
1	J.P.V.	9-13-76	DATE: MAY 1976	SCALE: AS NOTED
			JOB NO. 68-149	REPORT NO.
			DRAWING NO. C-6627-5	

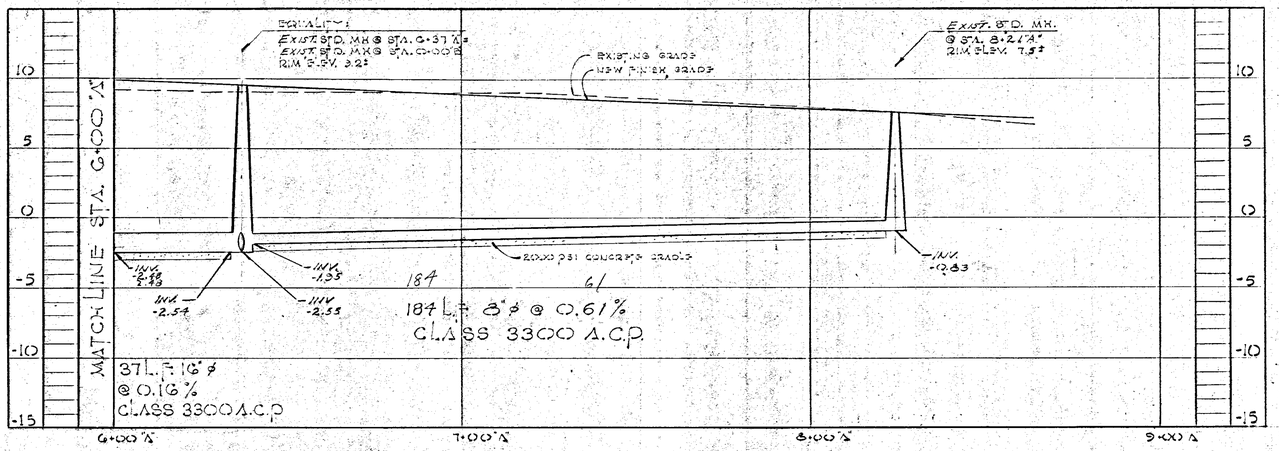
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

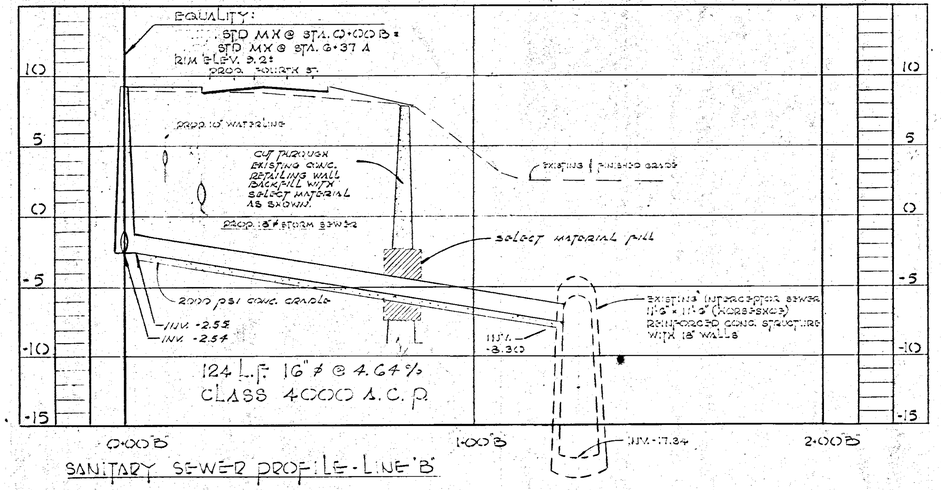
SANITARY SEWER: STA. 6+68 "A" TO STA. 8+24 "A"
STORM SEWER: STA. 5+00 TO 8+55, STA. 9+74 TO 10+00
WATER LINE: STA. 5+00 TO STA. 10+00

SHEET NO. 5 OF 16

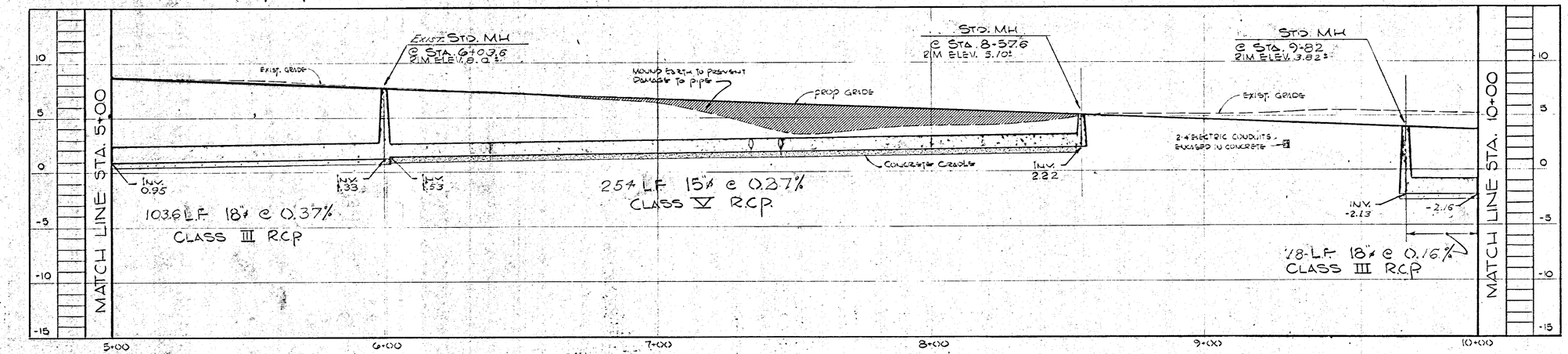
S4376D



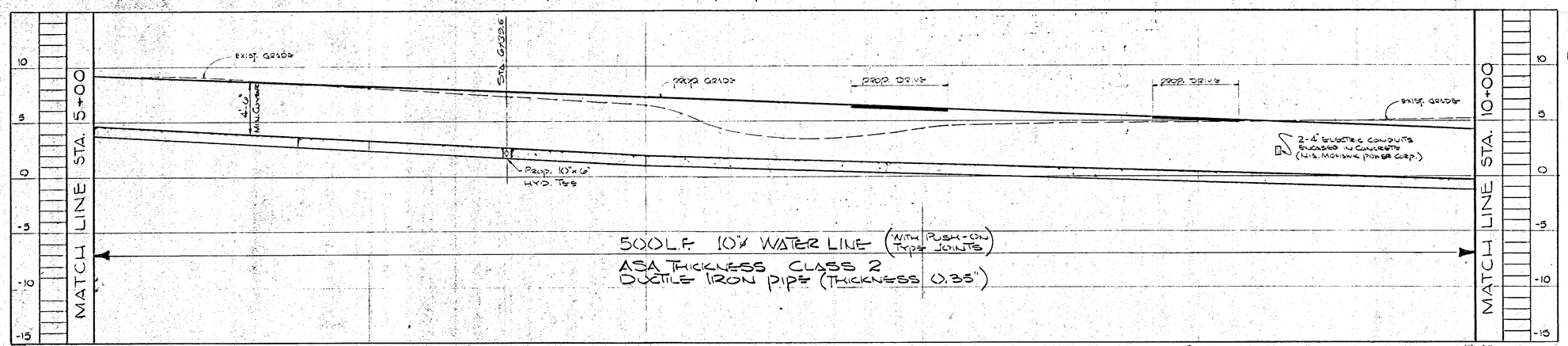
SANITARY SEWER PROFILE - LINE "Δ"



SANITARY SEWER PROFILE - LINE "B"



STORM SEWER PROFILE



WATERLINE PROFILE

NOTE: BACKFILL WITH SELECT MATERIAL TRENCHES IN EXISTING AND PROPOSED PAVEMENT AREAS.

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

REVISIONS				
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.
1	J.P.V.	9-15-75	DRAWN BY: R.M./J.V.	CHECKED BY: R.N.M.
			DATE: MAY 1975	SCALE: HOR. 1"=20' VERT. 1"=5'
			JOB NO. 68-142	REPORT NO.
			DRAWING NO. C-6627-6	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

BID SECTION "D"

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

SANITARY SEWER: STA. 6+00 "A" TO 8+24 "A"; 0+00 B TO 1+24 B
STORM SEWER: STA. 5+00 TO 8+55; 9+74 TO 10+00
WATERLINE: STA. 5+00 TO STA. 10+00

SHEET NO. 6 OF 16

S4376D

MARIN CONCRETE CO.

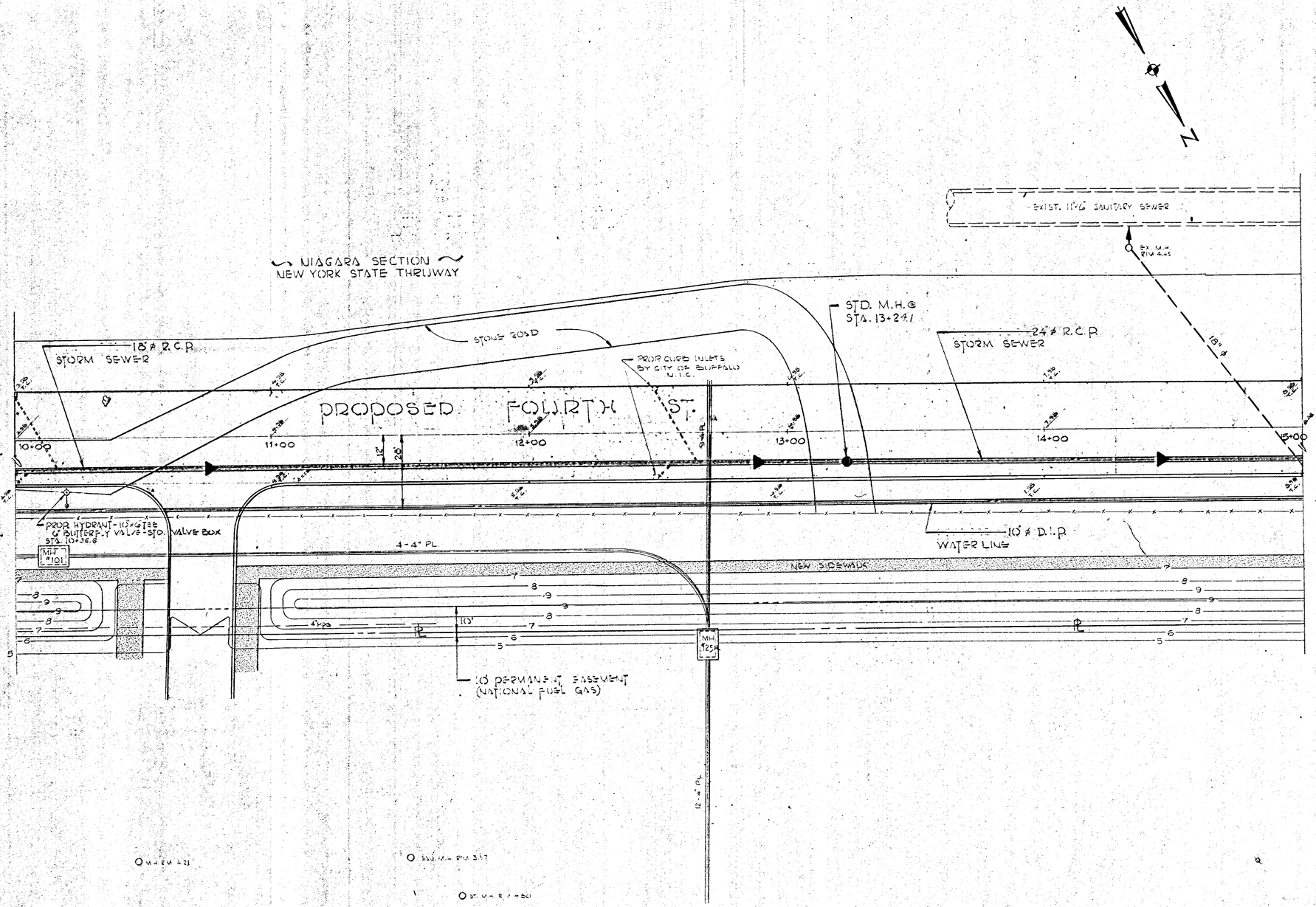
AS BUILT SURVEY
AUGUST 6, 1976

ELWOOD D. HUMMEL
LICENSED SURVEYOR 035609
341 SOUTH ST. - EAST AURORA, N.Y. 14052

STATE OF NEW YORK — ELWOOD D. HUMMEL — LICENSED LAND SURVEYOR

Elwood D. Hummel

NUSSBAUMER & CLARKE, INC.
REGISTERED ... ENGINEERING ...
CERTIFICATE NO. 037



NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

PLAN
SCALE: 1"=20'

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

MARIN CONCRETE CO.
Dave Murphy

AS BUILT SURVEY
AUGUST 6, 1976

ELWOOD D. HUMMEL
LICENSED SURVEYOR 035808
348 SOUTH ST. EAST AURORA, N.Y. 14052

STATE OF NEW YORK
ELWOOD D. HUMMEL
NO. 035808
LICENSED LAND SURVEYOR

Elwood D. Hummel

NUSSBAUMER & CLARKE P.C.
AUTHORIZED PURSUANT TO ARTICLE 145 TO PRACTICE PROFESSIONAL ENGINEERING AND LAND SURVEYING IN NEW YORK STATE
DEP. [illegible] 0.2.7.

PID SECTION "D"

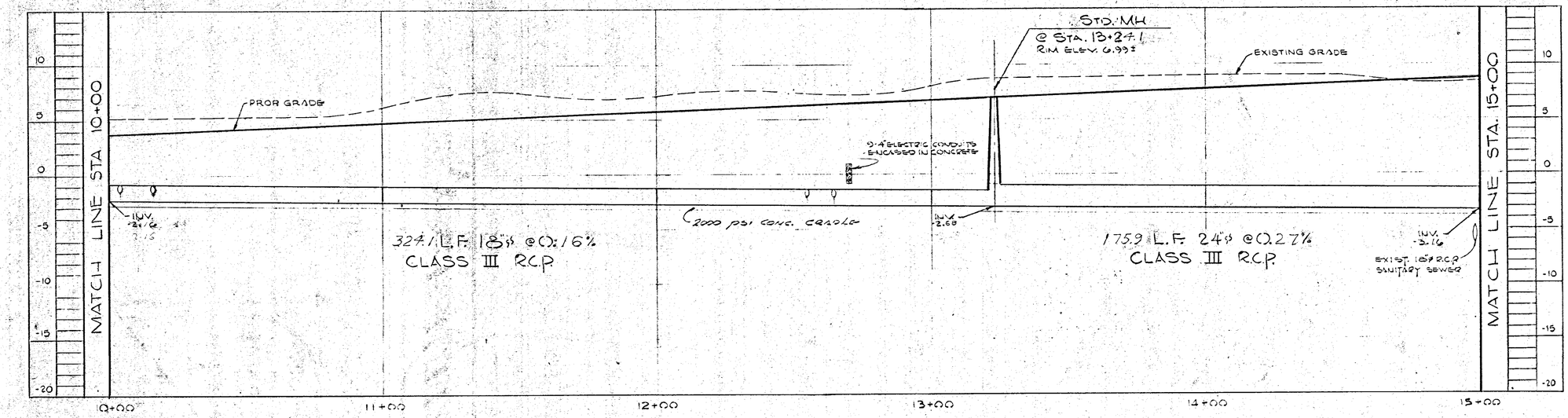
REVISIONS			DESIGNED BY: J.T.	CHECKED BY: J.T.
NO.	BY	DATE	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
1	J.P.V.	5-15-75	DATE: MAY 1975	SCALE: AS NOTED
			JOB NO. 68-149	REPORT NO.
			DRAWING NO. C-6627-7	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

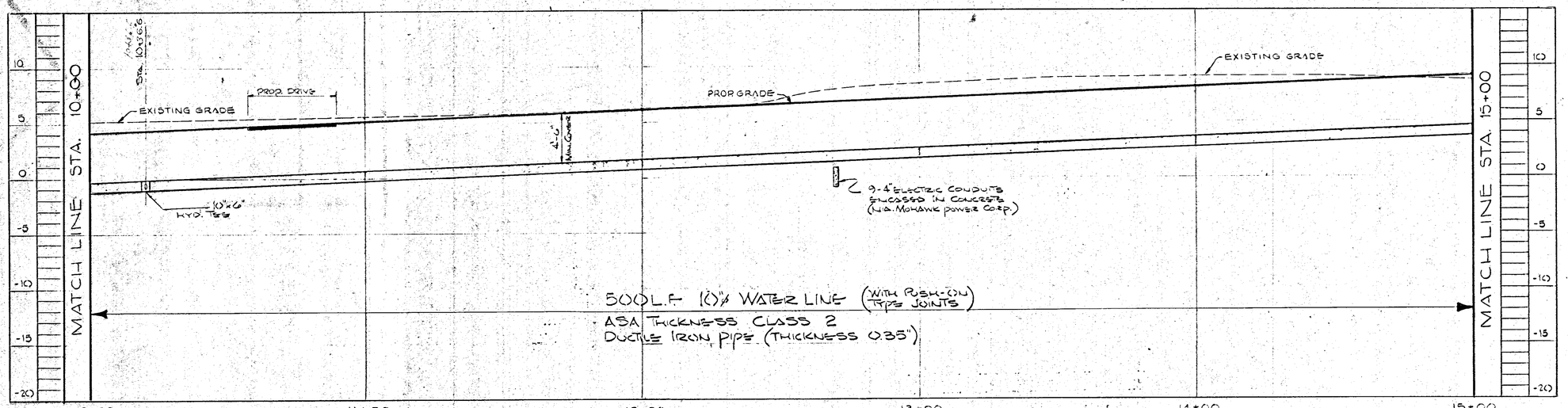
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35
STORM SEWER: STA. 10+00 TO STA. 15+00
WATER LINE: STA. 10+00 TO STA. 15+00

SHEET NO. 7 OF 16

S4376D



STORM SEWER PROFILE



WATER LINE PROFILE

MARIN CONCRETE CO.

As Built Survey August 6, 1976

ELWOOD D. HUMMEL
LICENSED SURVEYOR 035609
341 SOUTH ST. - EAST AURORA, N.Y. 14052

NUSSBAUMER & CLARKE, INC.
A CORPORATION DULY ORGANIZED AND EXISTING UNDER THE LAWS OF THE STATE OF NEW YORK

EID SECTION "D"

NOTE: BACKFILL WITH SELECT MATERIAL TRENCHES IN EXISTING AND PROPOSED PAVEMENT AREAS

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

REVISIONS		
NO.	BY	DATE
1	J.P.V.	9-15-75

DESIGNED BY: J.T.	CHECKED BY: J.T.
DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
DATE: MAY 1975	SCALE: HOR: 1"=20' VERT: 1"=5'
JOB NO. 68-149	REPORT NO.
DRAWING NO. C-6627-8	

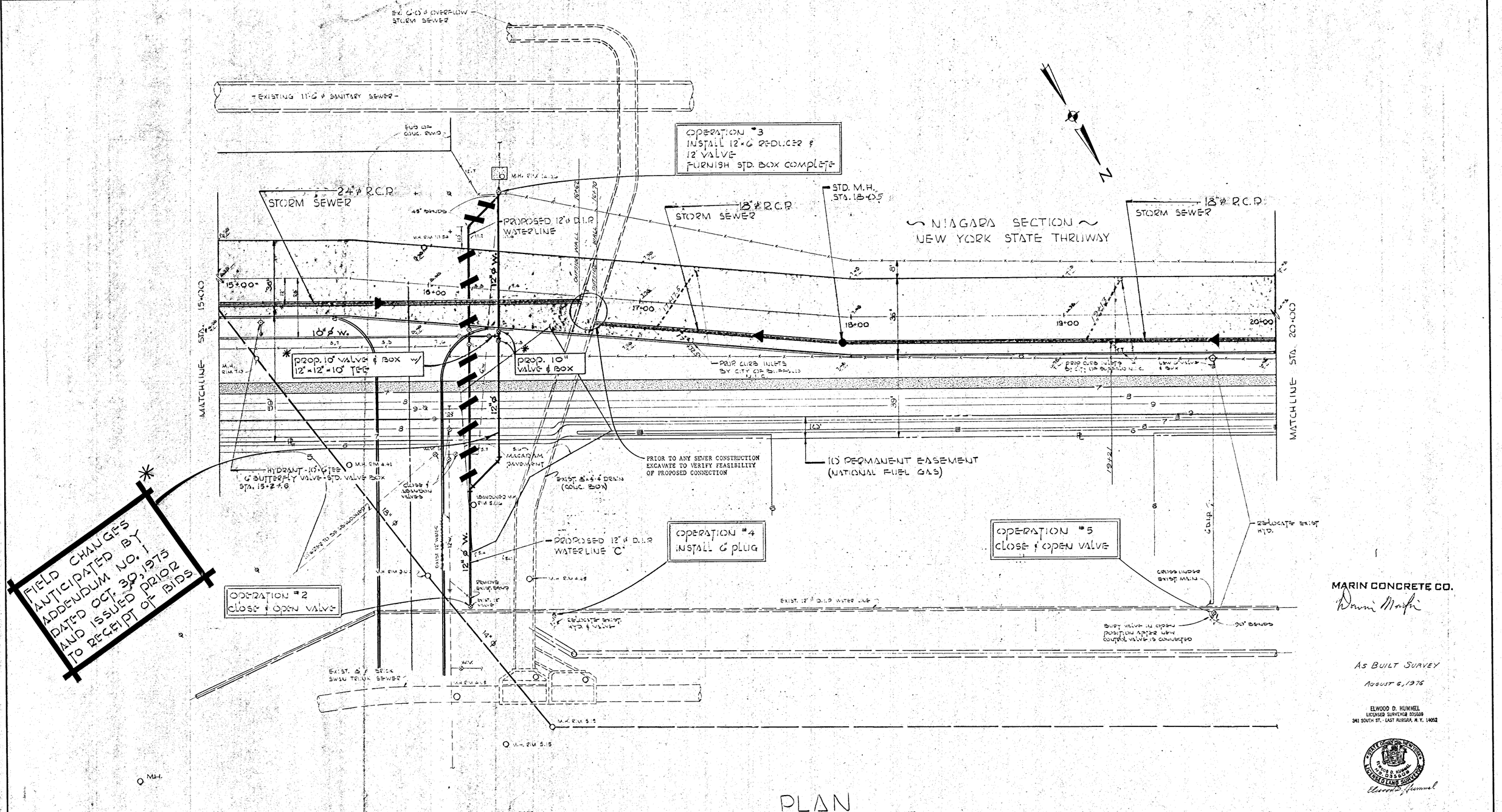
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER: STA. 10+00 TO STA. 15+00
WATER LINE: STA. 10+00 TO STA. 15+00

SHEET NO. 8 OF 16

S4376D



PLAN

SCALE 1"=20'

NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

MARIN CONCRETE CO.
Dawn Martin

AS BUILT SURVEY
AUGUST 6, 1976

ELWOOD D. HUMMEL
LICENSED SURVEYOR 035609
341 SOUTH ST. - EAST AURORA, N.Y. 14052

STATE OF NEW YORK ELWOOD D. HUMMEL 035609 LICENSED LAND SURVEYOR
Elwood D. Hummel

NUSSEA... PROFESSIONAL ENGINEER ... CERTIFI... 032...

BID SECTION "D"

REVISIONS			DESIGNED BY: J.T.	CHECKED BY: J.T.
NO.	BY	DATE		
1	J.P.V.	9-13-75	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
2	J.P.V.	2-20-76	DATE: MAY 1975	SCALE: AS NOTED
		FIELD CHANGE	JOB NO. 68-149	REPORT NO.
			DRAWING NO. C-6627-9	

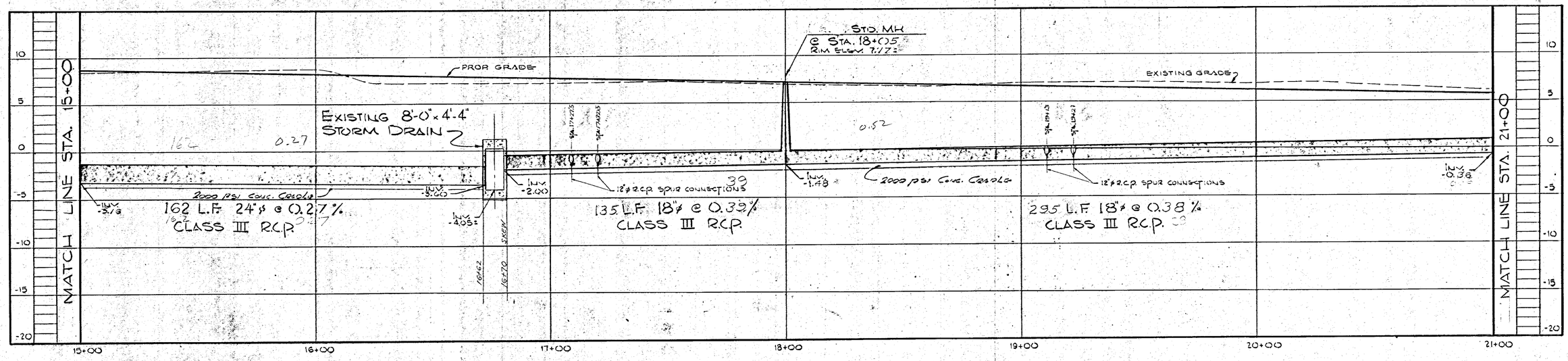
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER STA. 15+00 TO 16+72 ; 16+80 TO 20+00
WATER LINE: STA. 15+00 TO 16+21 ; 0+00"C" TO 2+12"C"

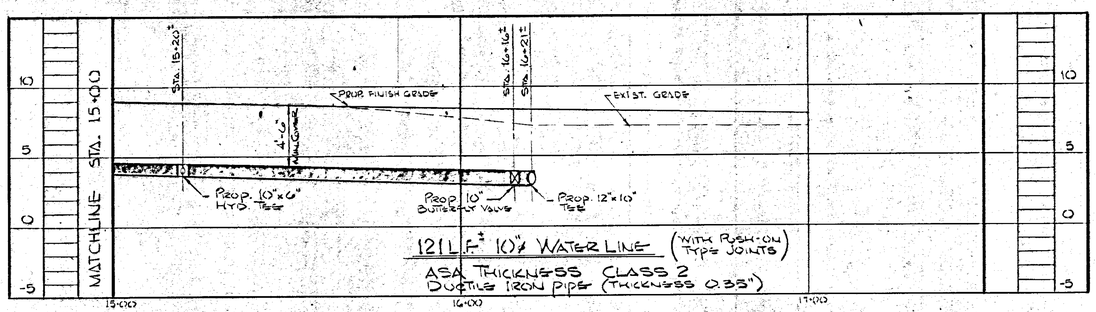
SHEET NO. 9 OF 16

S4376D

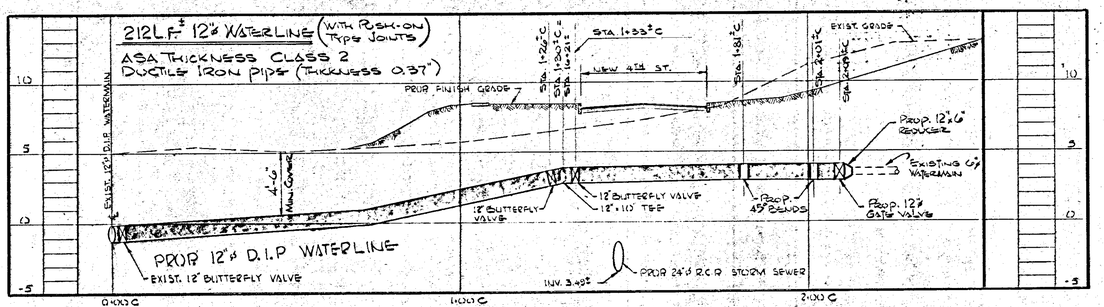


STORM SEWER PROFILE

357LM

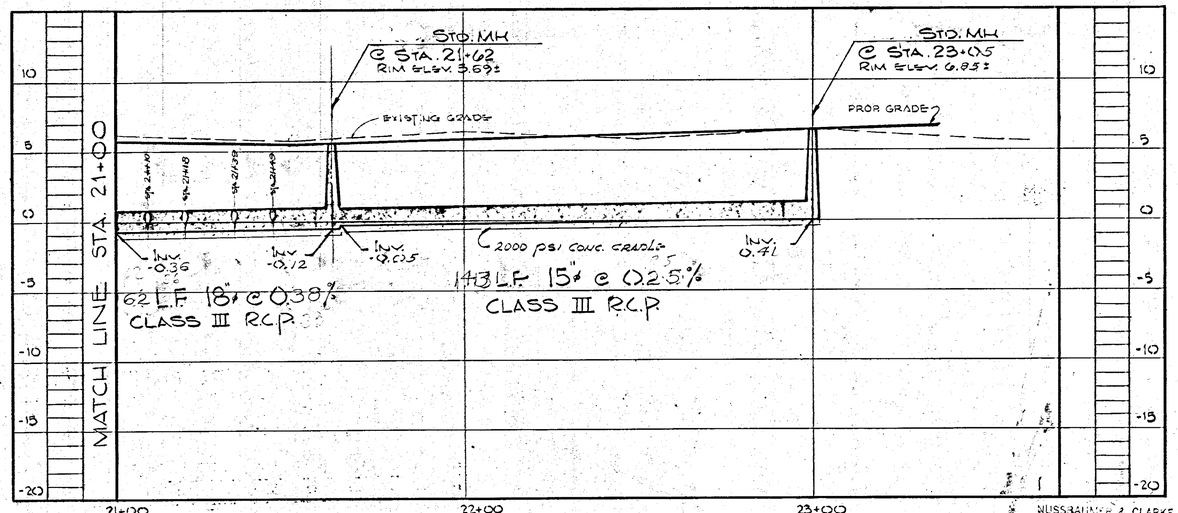


WATER LINE PROFILE



WATERLINE PROFILE - LINE "C"

NOTE: BACKFILL WITH SELECT MATERIAL TRENCHES IN EXISTING AND PROPOSED PAVEMENT AREAS.



NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

STORM SEWER PROFILE
MARIN CONCRETE CO.

AS BUILT SURVEY
AUGUST-6, 1976

ELWOOD D. HUMMEL
LICENSED SURVEYOR 035609
241 SOUTH ST. - EAST AURORA, N. Y. 14052

NUSSBAUMER & CLARKE, INC.
A CORPORATION ENGAGED TO START & PROFESSIONAL ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE NO. 037

BID SECTION "D"

REVISIONS NO.	BY	DATE
1	J.P.V.	9-13-76

DESIGNED BY: J.T.	CHECKED BY: J.T.
DRAWN BY: R.W./J.P.	CHECKED BY: R.N.M.
DATE: MAY 1975	SCALE: HOR. 1"=20' VERT. 1"=5'
JOB NO. 68-149	REPORT NO.
DRAWING NO. C-6627-10	

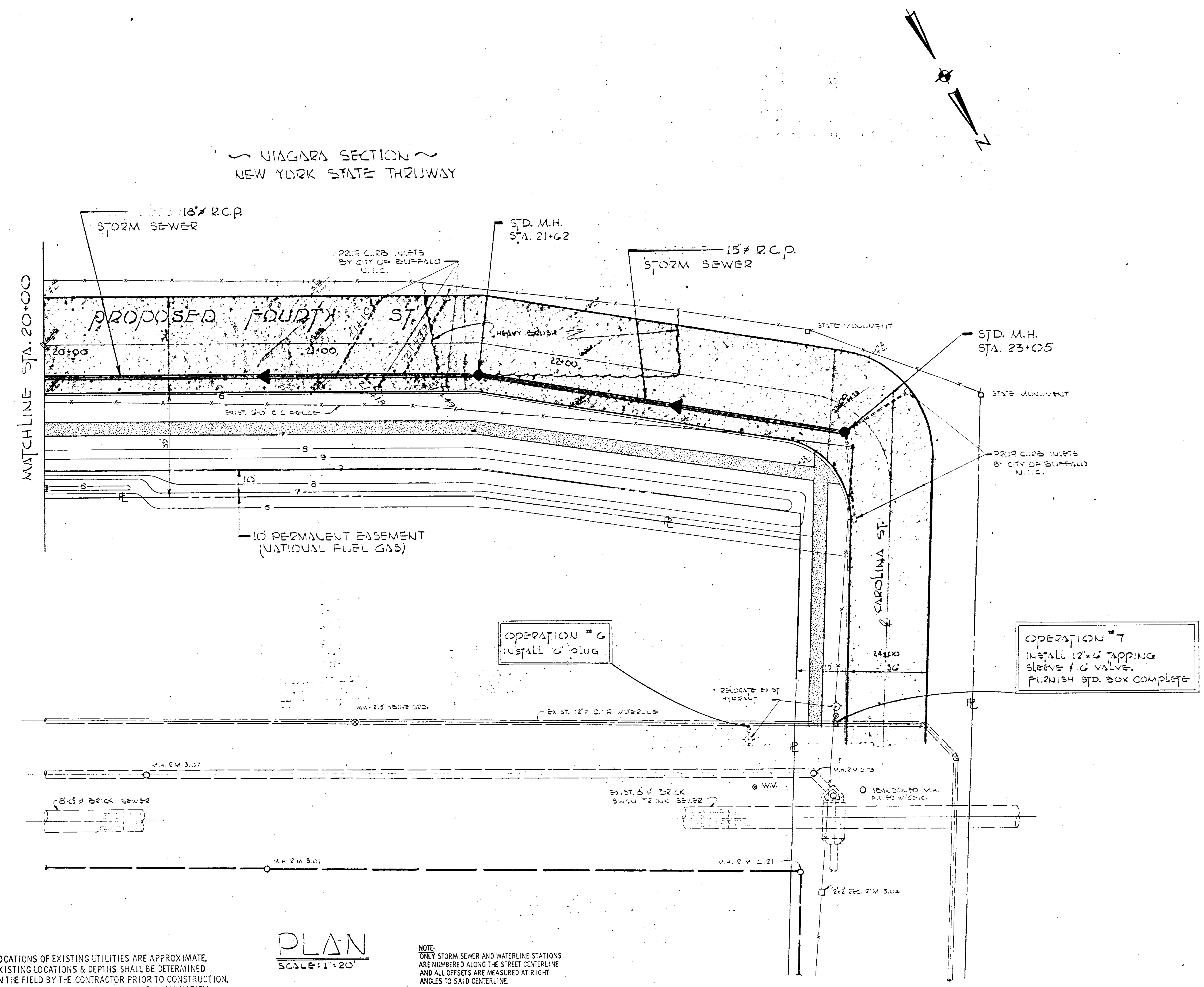
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

STORM SEWER: STA. 15+00 TO 16+72; 16+80 TO 23+00
WATER LINE: STA. 15+00 TO 16+21; 0+00C TO 2+12"C"

SHEET NO. 10 OF 16

S4376D



MARIN CONCRETE CO.

AS BUILT SURVEY
AUGUST 6, 1976
ELWOOD D. HUMMEL
LICENSED SURVEYOR

PLAN
SCALE: 1" = 20'

NOTE:
1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. EXISTING LOCATIONS & DEPTHS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. PRIOR TO EXCAVATION THE CONTRACTOR SHALL NOTIFY UTILITIES TO LOCATE THEIR LINES.
3. ELEVATIONS SHOWN ARE BASED ON CITY OF BUFFALO DATUM.

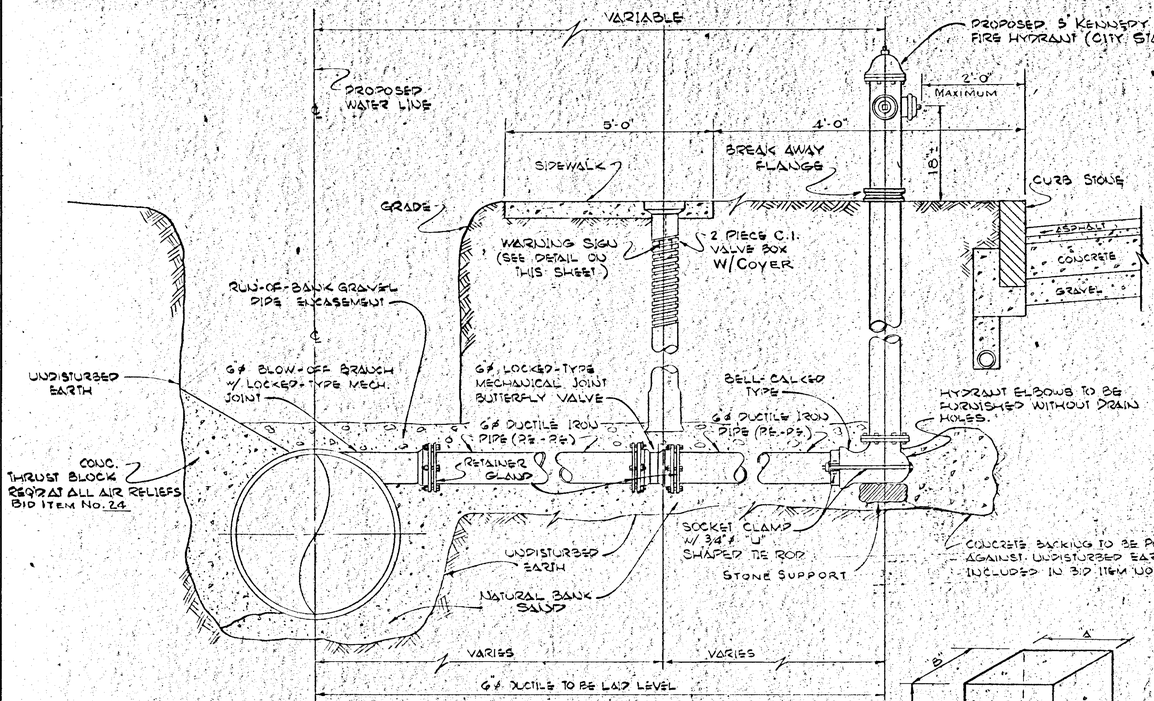
NOTE:
ONLY STORM SEWER AND WATERLINE STATIONS ARE NUMBERED ALONG THE STREET CENTERLINE AND ALL OFFSETS ARE MEASURED AT RIGHT ANGLES TO SAID CENTERLINE.

BID SECTION "D"

REVISIONS						
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.	NUSSBAUMER & CLARKE, INC.	CITY OF BUFFALO, NEW YORK
1	J.P.V.	9-15-75	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.	CONSULTING ENGINEERS	DEPARTMENT OF COMMUNITY DEVELOPMENT WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35
			DATE: MAY 1975	SCALE: AS NOTED	BUFFALO, NEW YORK	
			JOB NO. 68-149	REPORT NO.		STORM SEWER: STA. 20+00 TO STA. 23+00
			DRAWING NO. C-6627-11			

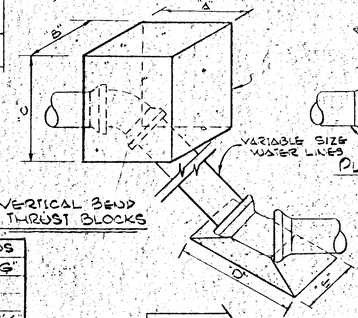
SHEET NO. 11 OF 16

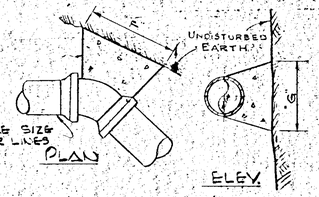
S4376D

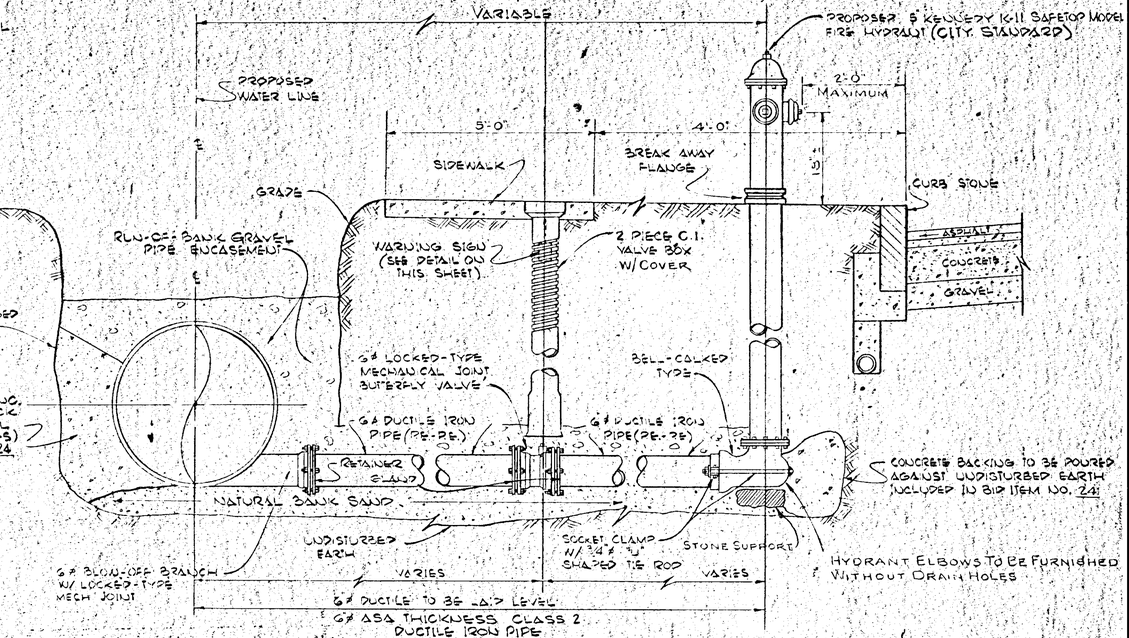


TYPICAL AIR-RELIEF DETAIL

NO SCALE

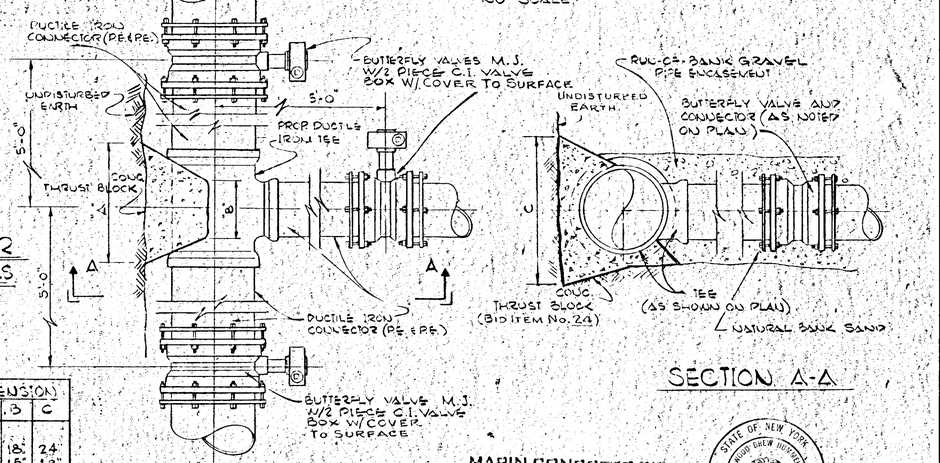






TYPICAL BLOW-OFF DETAIL

NO SCALE



PLAN

TYPICAL DETAIL FOR VALVE LOCATIONS AND THRUST BLOCKING FOR TEES

NO SCALE

SECTION A-A

DIMENSION	A	B	C
12" ø PIPE	2'-6"	18"	24"
10" ø PIPE	2'-0"	15"	18"

TYPICAL DETAILS FOR WATER LINE THRUST BLOCKS

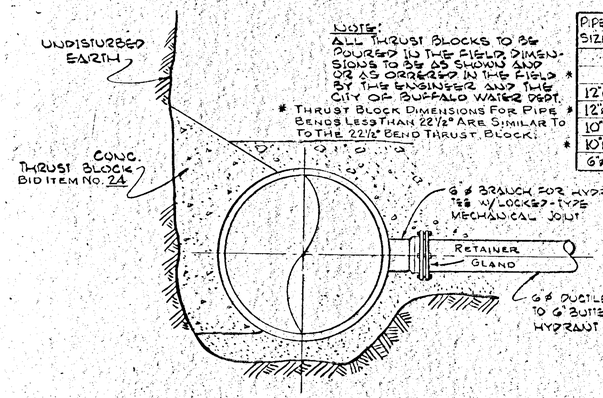
BID ITEM No. 24

POURED CONCRETE

PIPE SIZE	PIPE BEND	THRUST BLOCK DIMENSIONS "A"	"B"	"C"	"D"	"E"	"F"	"G"
12" ø	45°	3'-0	3'-0	4'-0	3'-6	2'-6	2'-6	2'-6
12" ø	22 1/2°	3'-0	3'-0	3'-0	2'-6	2'-6	2'-3	2'-3
10" ø	45°	2'-6	2'-6	3'-0	2'-6	2'-0	2'-0	2'-0
10" ø	22 1/2°	2'-0	2'-0	3'-0	1'-6	1'-6	1'-6	1'-6
6" ø	90° to 22 1/2°						1'-6	1'-6

NOTE: ALL THRUST BLOCKS TO BE POURED IN THE FIELD. DIMENSIONS TO BE AS SHOWN AND OR AS ORDERED IN THE FIELD BY THE ENGINEER AND THE CITY OF BUFFALO WATER DEPT.

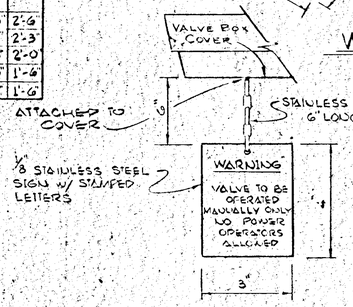
* THRUST BLOCK DIMENSIONS FOR PIPE BENDS LESS THAN 22 1/2° ARE SIMILAR TO THE 22 1/2° BEND THRUST BLOCK.



TYPICAL HYDRANT TEE DETAIL

NO SCALE

(IDENTICAL TO DETAIL SHOWN FOR AIR-RELIEF OR BLOW-OFF HYDRANTS)



WARNING SIGN DETAIL

(TO BE INSTALLED IN ALL VALVE BOXES)
BID ITEM NO'S 22 & 23

MARIN CONCRETE CO.

STATE OF NEW YORK — LAWRENCE DREW IMBRIE — No. 038808 — LICENSED LAND SURVEYOR

August 6, 1976

As Built

SURVEYED & PLOTTED BY ENGINEERS OF STATE OF NEW YORK

DATE 9-1-76

BID SECTION "D"

REVISIONS NO.	BY	DATE
1	J.Q.V.	9-13-76

DESIGNED BY: J.T. — CHECKED BY: J.T.
DRAWN BY: — CHECKED BY: R.V.M.
DATE: MAY, 1975 — SCALE: AS NOTED
JOB NO. 68-149 — REPORT NO.
DRAWING NO. C-6627-12

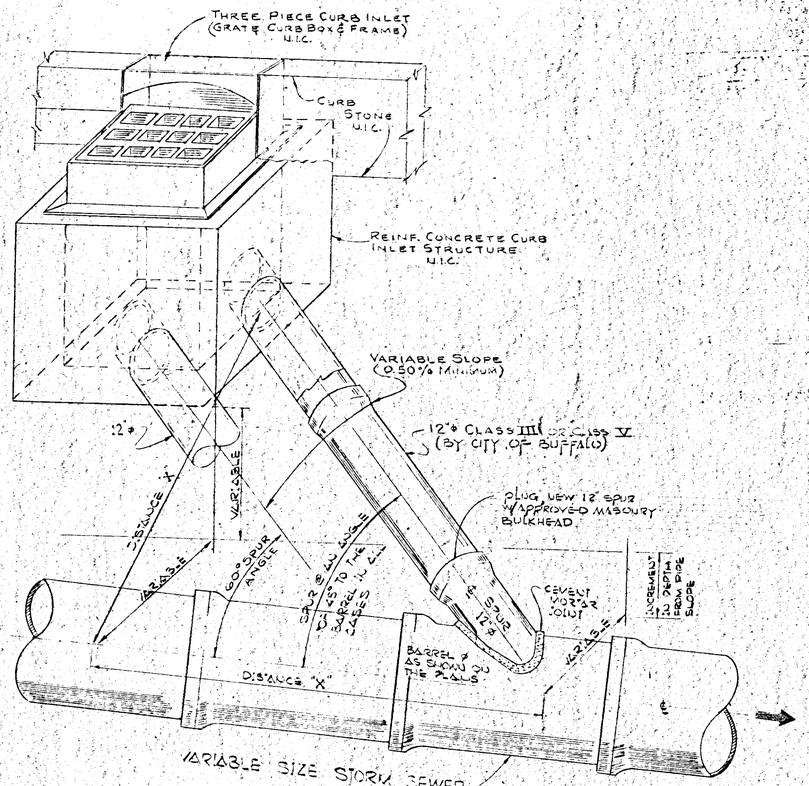
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

HYDRANT, VALVE & TEE DETAILS
THRUST BLOCK DETAILS FOR WATERLINES

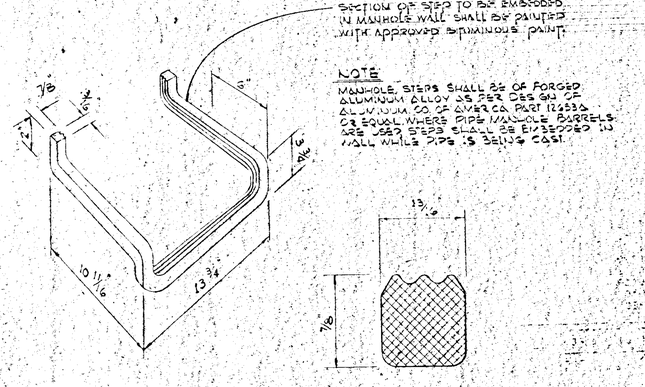
SHEET NO. 12 OF 16

S4376D



TYPICAL CURB INLET & SPUR PIPE CONNECTION TO STORM SEWERS

NO SCALE



NOTE

MANHOLE STEPS SHALL BE OF FORGED ALUMINUM ALLOY AS PER SPECIFICATION OF ALUMINUM CO. OF AMERICA PART 12553A OR EQUAL WHERE PIPE MANHOLE BARRELS ARE USED STEPS SHALL BE EMBEDDED IN WALL WHILE PIPE IS BEING CAST.

STEP DETAIL

NO SCALE

For depths up to twelve (12) feet (measured from ground to lowest invert) monolithic precast bases shall be set on trench bottom carefully shaped and levelled. Any over-excavation shall be backfilled with material as specified for bedding sewer pipe, and shall be tamped.

For depths exceeding twelve (12) feet, monolithic precast bases shall be set on eight (8) inch thick 3500 PSI concrete slabs poured against undisturbed trench bottom.

Backfill around pipes at manholes shall be carefully tamped.

STD. MH. FRAME & COVER EXCEPT WHERE OTHERWISE ORDERED BY THE ENGINEER. RIM ELEVATION SHALL BE 9 TO 12 INCHES ABOVE THE ELEVATION OF ADJACENT GROUND

ADJUST TO GRADE WITH APPROVED PRE-CAST CONCRETE EXTENSION RINGS. EXTENSION RING JOINTS TO BE MADE WITH COMPOUND AS SPECIFIED FOR PIPE JOINTS ON THIS DETAIL.

* ENTIRE OUTSIDE SURFACE FROM CASTING TO CONE, TO BE "BUTTERED" WITH APPROVED COMPOUND DEWITT #10, DURALSEAL 3101, PIONEER 301, OR EQUAL AND WRAPPED WITH A BAND OF "KRAFT" OR EQUAL PAPER.

ASTM C478 (LATEST DATE) REINFORCED CONCRETE TONGUE AND GROOVE SECTIONS IN 2', 3' OR 4' LENGTHS, WITH ROUND NEOPRENE GASKETS.

REFER TO REDUCER SECTION PLAN

60" DIA. TO 48" DIA. REDUCER SECTION

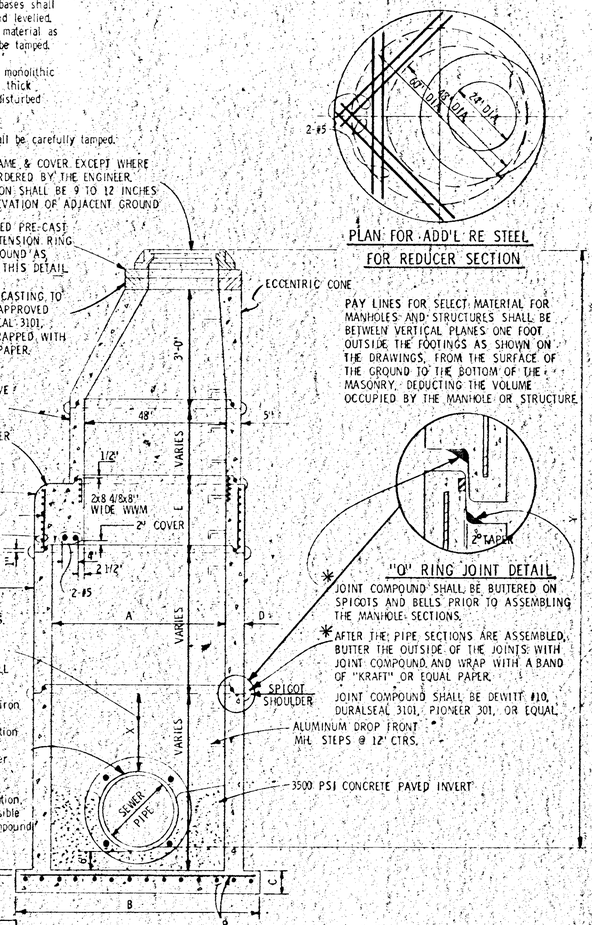
#4 VERT. 6 EQUAL SPACES

#42" DIA. HOOPS @ 3" C/C HORIZ.

* ALL OUTSIDE SURFACES TO BE COATED WITH KOPPERS BITUMASTIC SUPER SERVICE BLACK, METALIFE-HBP OR OTHER APPROVED EQUAL COATING HAVING A MINIMUM TOTAL DRY THICKNESS OF 22 MILS.

"X" - THE DISTANCE BETWEEN SPIGOT SHOULDER AND TOP OR CROWN OF OPENING IN THE PRE-CAST WALL

RES-SEAL consisting of rubber gasket, cast iron compression flange, and Cor-Ten bolt assembly manufactured by the Scales Manufacturing Corporation of Newburgh, New York. LINK-SEAL consisting of solid, synthetic rubber links connected to each other with heavy, elongated washers, bolts and nuts, as manufactured by the Thunderline Corporation of Wayne, Michigan, or approved equal. After installation, metal parts of the above assemblies that are accessible from inside the manholes shall be coated with compound as specified for manhole barrel joints.



PLAN FOR ADD'L RE STEEL FOR REDUCER SECTION

PAY LINES FOR SELECT MATERIAL FOR MANHOLES AND STRUCTURES SHALL BE BETWEEN VERTICAL PLANES ONE FOOT OUTSIDE THE FOOTINGS AS SHOWN ON THE DRAWINGS, FROM THE SURFACE OF THE GROUND TO THE BOTTOM OF THE MASONRY, DEDUCTING THE VOLUME OCCUPIED BY THE MANHOLE OR STRUCTURE.

"O" RING JOINT DETAIL

JOINT COMPOUND SHALL BE BUTTERED ON SPIGOTS AND BELLS PRIOR TO ASSEMBLING THE MANHOLE SECTIONS.

* AFTER THE PIPE SECTIONS ARE ASSEMBLED, BUTTER THE OUTSIDE OF THE JOINTS WITH JOINT COMPOUND AND WRAP WITH A BAND OF "KRAFT" OR EQUAL PAPER.

JOINT COMPOUND SHALL BE DEWITT #10, DURALSEAL 3101, PIONEER 301, OR EQUAL.

DIMEN SIONS	SEWERS 8-16" DIA.		SEWERS 18-30" DIA.	
A	48"		60"	
B	70"		54"	
C	6"		8"	
D	9"		9"	
E	—		24"	
X	Y≤8'	6" MIN	12" MIN	
	Y>8'	12" MIN		
	D>10'	12" MIN		
	Y	R	Y	R
Y	12' MAX	#4 @ 6" EW	12' MAX	#4 @ 6" EW
	12'-30'	#5 @ 6" EW	12'-30'	#5 @ 5" EW

MONOLITHIC PRECAST BASE MANHOLES FOR SEWERS 8" THROUGH 30" DIAMETER

* NOTE: FOR STORM SEWER MANHOLES, COATING FOR OUTSIDE SURFACES AND JOINT COMPOUND WILL NOT BE REQUIRED

MARIN CONCRETE CO.

STD. PRECAST MANHOLE DETAIL FOR SANITARY & STORM SEWERS

NO SCALE

STATE OF NEW YORK — LEONARD DREW HOSPITAL — No. 032607 — LICENSED LAND SURVEYOR

REVISIONS			DESIGNED BY: J.T.	CHECKED BY: J.T.
NO.	BY	DATE	DRAWN BY: J.P.V.	CHECKED BY: R.N.M.
(1)	J.P.V.	9-15-75	DATE: MAY 1975	SCALE: AS NOTED
			JOB NO. C-S-149	REPORT NO.
			DRAWING NO. C-6627-13	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

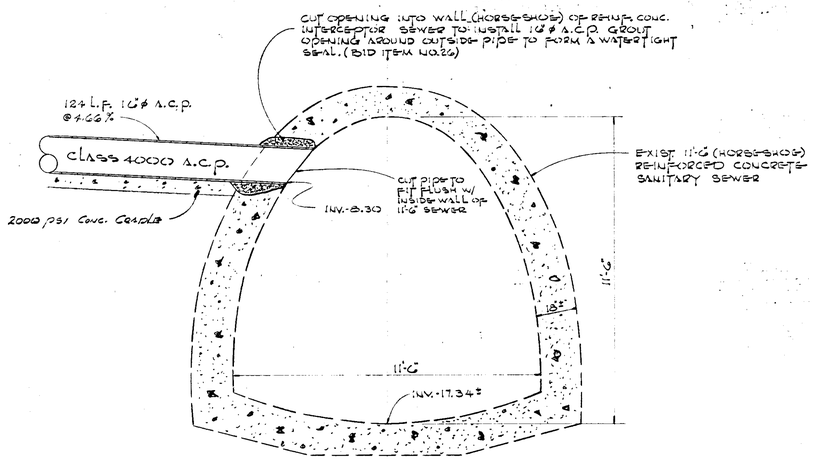
BID SECTION "D"

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. NYR-35

STD. PRECAST MANHOLE DETAIL & SPUR CONNECTION PIPE

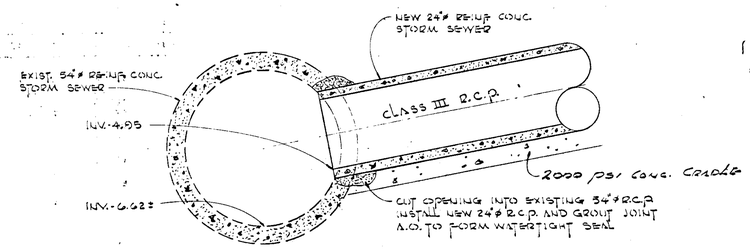
SHEET NO. 13 OF 16

S4376D



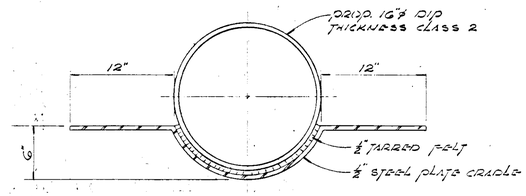
PROPOSED SANITARY SEWER CONNECTION TO EXISTING INTERCEPTOR SEWER @ STA. 1+24 "B"

SCALE: 3/8"=1'



PROPOSED STORM SEWER CONNECTION TO EXISTING 54"ø STORM SEWER @ STA. 0+28

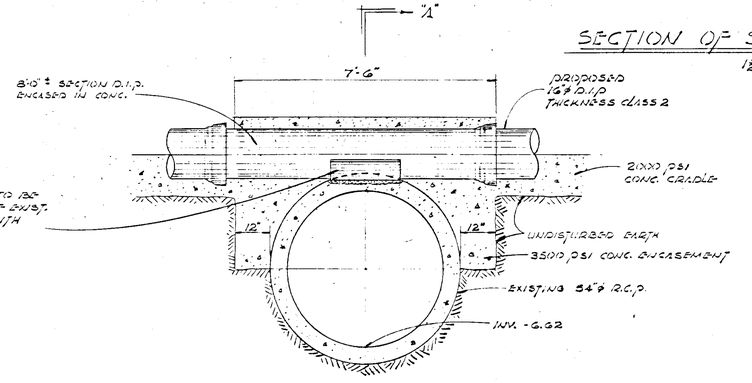
SCALE: 1/2"=1'



SHOP PAINT ALL EXPOSED CRADLE SURFACES WITH (1) COAT OF KOPPERS GEL TONE PRIMER SHOP COAT AND (2) COATS OF KOPPERS BITUMASTIC NO. 300-M

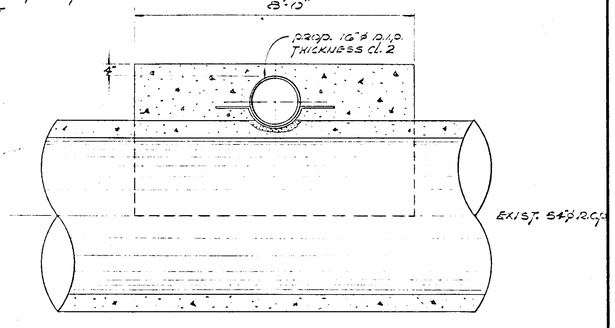
SECTION OF STEEL PLATE CRADLE

1/2"=1'-0"



SECTIONAL VIEW

1/2"=1'-0"

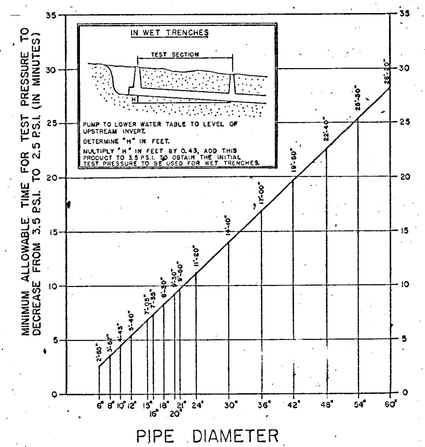


SECTION "A"-"A"

1/2"=1'-0"

ACCEPTABLE TESTING CURVE

(USING 3.5 P.S.I. INITIAL AIR PRESSURE)
(DRY TRENCHES)



NUSSBAUMER & CLARKE, INC. CONSULTING ENGINEERS BUFFALO, N.Y.

CROSSING DETAIL AT STA. 1+98 "A"

MARIN CONCRETE CO.
Dave Murphy

STATE OF NEW YORK ELWOOD DREW HUNNEL No. 035609 REGISTERED LAND SURVEYOR
August 6, 1976
As Built

BID SECTION "D"

REVISIONS					
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: J.T.	
1	J.P.V.	2-15-76	DRAWN BY: J.P.V.	CHECKED BY: E.H.M.	
			DATE: MAY 1975	SCALE: AS NOTED	
			JOB NO. 68-149	REPORT NO.	
			DRAWING NO. C-6627-16		

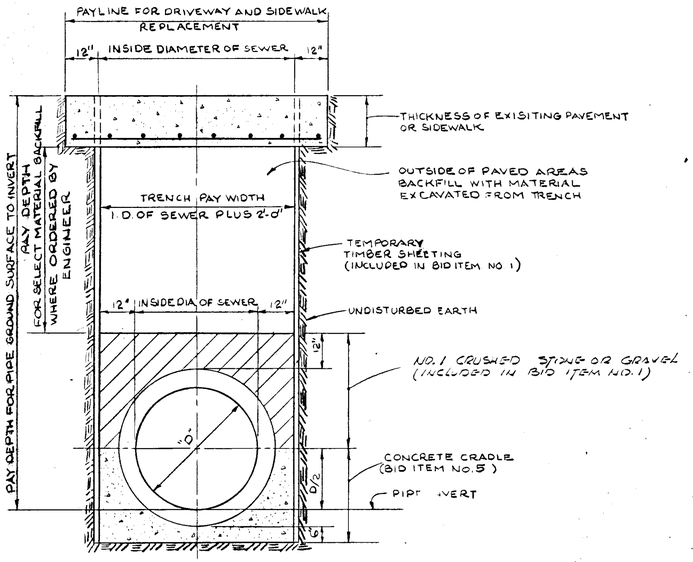
NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

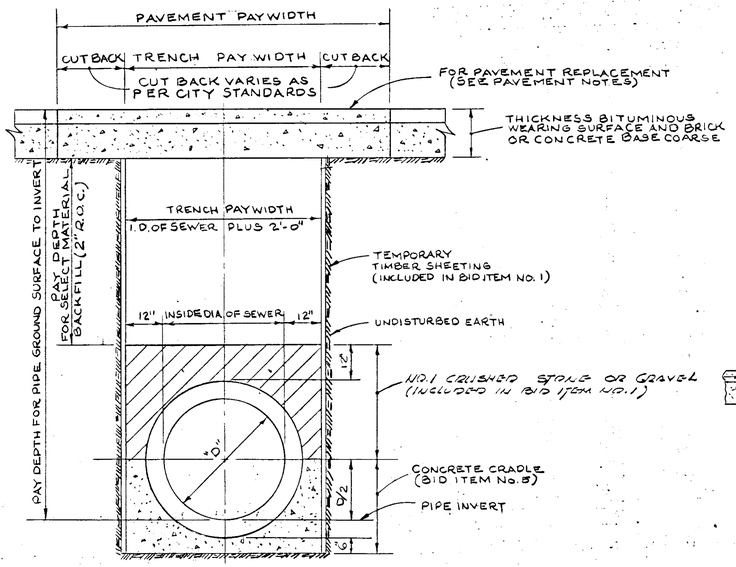
MISCELLANEOUS DETAILS

SHEET NO. 16 OF 16

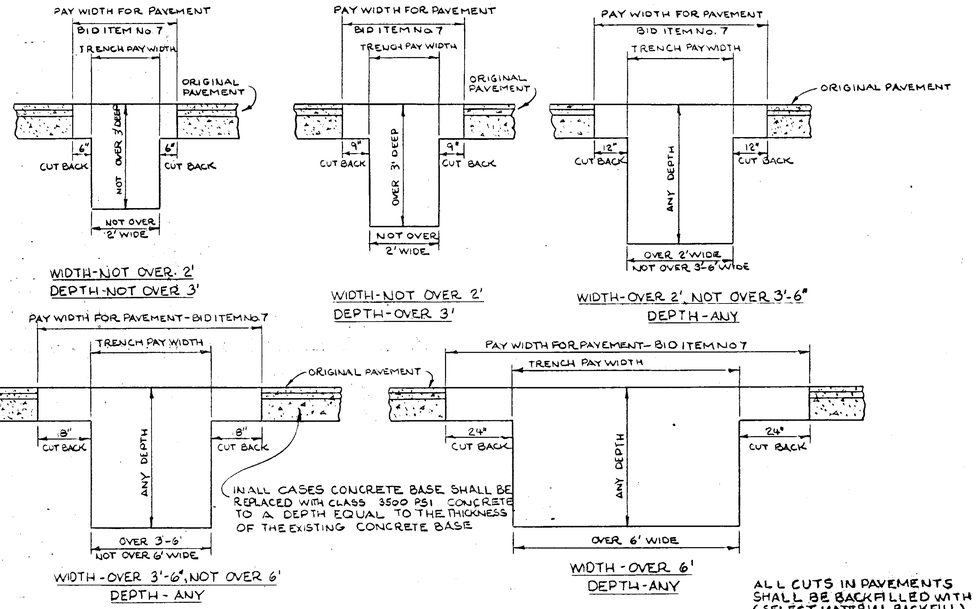
S4376D



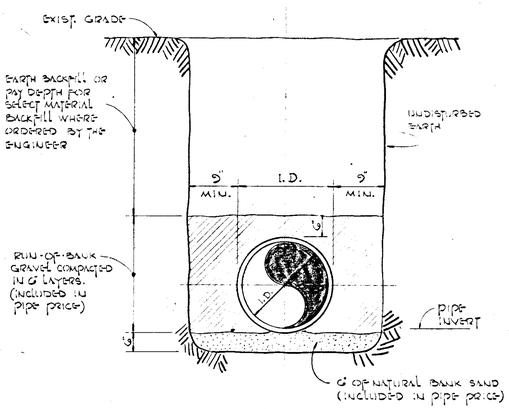
TYPICAL TRENCH DETAIL
IN UNPAVED AREAS
FOR SEWERLINES



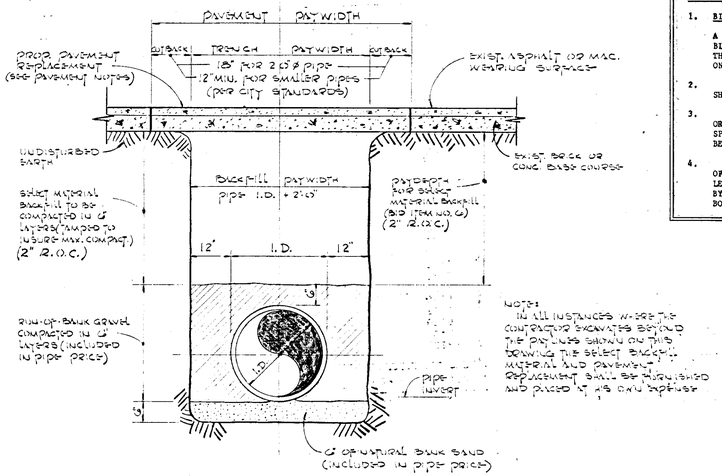
TYPICAL TRENCH DETAIL
IN PAVED AREAS
FOR SEWERLINES



ALL CUTS IN PAVEMENTS SHALL BE BACKFILLED WITH (SELECT MATERIAL BACKFILL) BID ITEM No. 6 (2" R.O.C.)



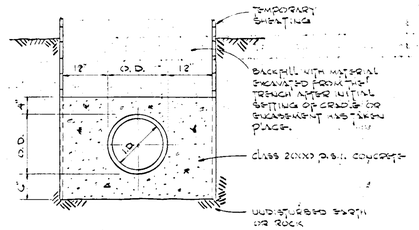
TYPICAL TRENCH DETAIL
IN UNPAVED AREAS
FOR WATERLINES



TYPICAL TRENCH DETAIL
IN PAVED AREAS
FOR WATERLINES

PAVEMENT REPLACEMENT

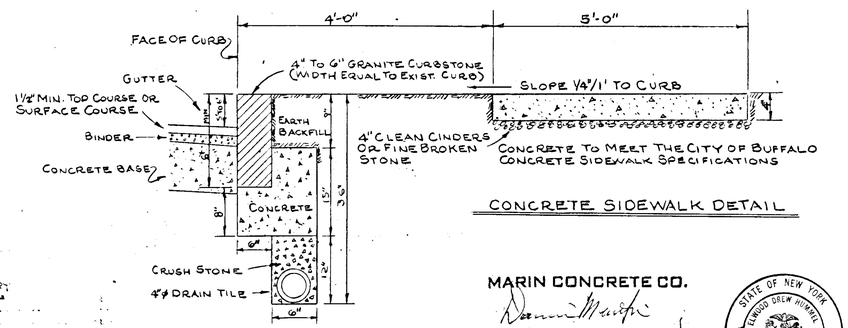
1. BID ITEM NO. 7: "BITUMINOUS WEARING SURFACE" INCLUDES REPLACEMENT OF CONCRETE PAVEMENT BASE TO A DEPTH EQUAL TO THE THICKNESS OF THE EXISTING BASE: BITUMINOUS BINDER COURSE TO EXTEND FROM THE TOP OF THE CONCRETE BASE TO THE TOP COURSE: AND A ONE AND ONE-HALF INCH THICK TOP COURSE.
2. FINISHED GRADE OF ALL PAVEMENT REPLACEMENT SHALL BLEND WITH THE ORIGINAL STREET ELEVATION.
3. ALL PAVEMENT TO CONFORM WITH THE CITY OF BUFFALO OR THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION SPECIFICATIONS - DEPENDING ON JURISDICTION IN AREA BEING RESURFACED.
4. MEASUREMENT FOR PAYMENT SHALL BE THE NUMBER OF SQUARE YARDS AS DERIVED BY MULTIPLYING THE LENGTH OF CUT (ORDERED TO BE MADE BY THE ENGINEER) BY THE PAY WIDTHS SHOWN ON THIS DETAIL AND INCLUDES BOTH THE TOPPING AND BASE.



TYPICAL CONCRETE ENCASEMENT DETAIL
TO BE USED WHERE ORDERED BY ENGINEER

CUT BACK OF PAVEMENTS
INCLUDING BASE FOR OPENINGS IN PAVEMENT

THE ABOVE ARE THE REQUIREMENTS OF THE DEPT. OF PUBLIC WORKS OF THE CITY OF BUFFALO, N.Y. AND SHALL BE STRICTLY ADHERED TO DURING THE CONSTRUCTION OF THIS PROJECT.



CONCRETE SIDEWALK DETAIL

STANDARD TYPE OF CURB AND DRAIN TILE CONSTRUCTION

MARIN CONCRETE CO.

STATE OF NEW YORK — EDMUND DREW HUNNEL — No. 035659 — LICENSED LAND SURVEYOR

August 6, 1976
As Built

NUSSBAUMER & CLARKE, INC. CONSULTING ENGINEERS BUFFALO, NEW YORK
CERTIFICATE NO. 027

BID SECTION "D"

REVISIONS				
NO.	BY	DATE	DESIGNED BY: J.T.	CHECKED BY: R.N.M.
1	J.P.V.	9-15-75	DRAWN BY: P.A.W.	CHECKED BY: J.P.V.
			DATE: MAY 1975	SCALE: NONE
			JOB NO. 68-149	REPORT NO.
			DRAWING NO. C-6627-15	

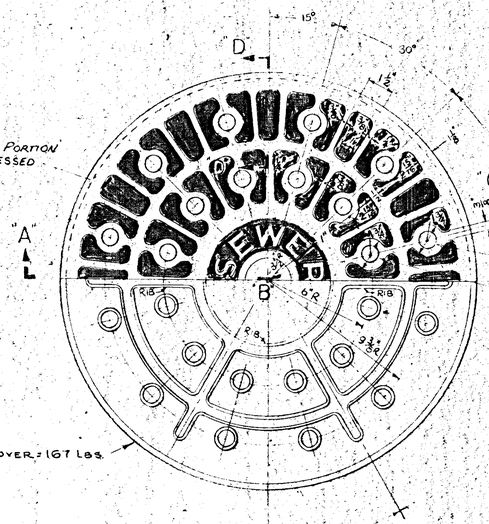
CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. N.Y.R.-35

TRENCH DETAILS FOR SEWER & WATER LINES

SHEET NO. 15 OF 16

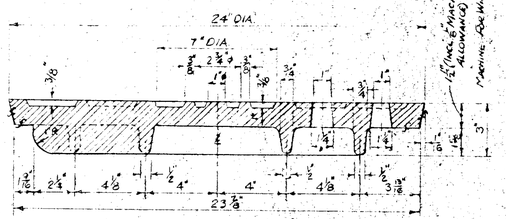
S4376D

HALF PLAN
TOP OF COVER

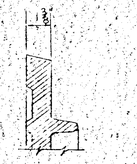


CALCULATED WEIGHT OF COVER = 167 LBS.

HALF PLAN
UNDER SIDE OF COVER



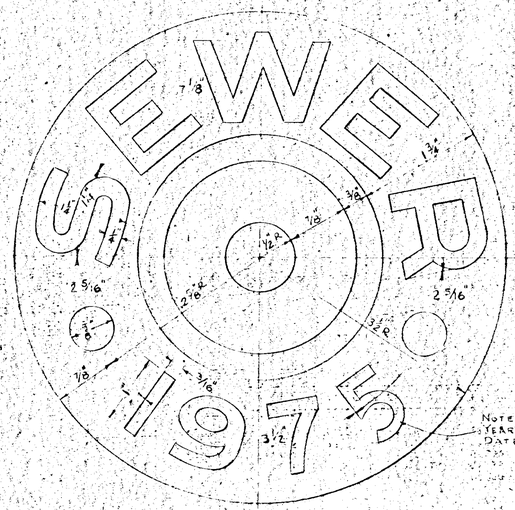
SECTION "A"-"B"-"C"
COVER



SECTION "D-D"

CORE 12 VENT HOLES ON 18 3/4" CIRCLE, 30° CTRS.

CORE 12 VENT HOLES ON 12" CIRCLE, 30° CTRS

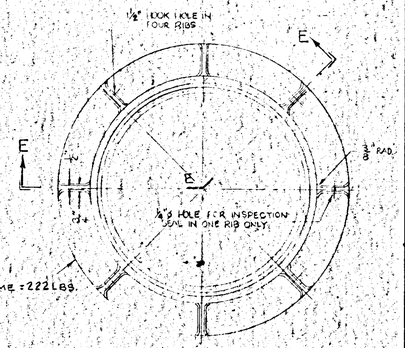


NOTE:
YEARLY DATE TO CONFORM TO DATE OF MANUFACTURE

DETAIL AT CENTER OF COVER
SCALE: FULL SIZE

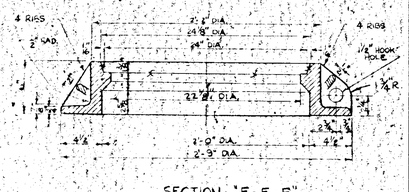
MATERIAL CLASS 35B GRAY IRON

NOTE: ALL PARTS TO BE COMPLETELY INTERCHANGEABLE WITH EACH OTHER.



CALCULATED WEIGHT OF FRAME = 222 LBS.

PLAN



SECTION "E-E-E"

MANHOLE FRAME
SCALE: 1½" = 1'-0"

NOTE
THE CONTRACTOR SHALL PURCHASE FROM THE BUFFALO SEWER AUTHORITY ALL FRAMES & COVERS FOR MANHOLES AND CHAMBERS TO BE BUILT UNDER THIS PROJECT. SUCH FRAMES AND COVERS SHALL HAVE WEIGHTS AND DIMENSIONS SHOWN ABOVE AND SPECIFIED ELSEWHERE. THE COST OF ALL FRAMES AND COVERS REQUIRED FOR THIS PROJECT SHALL BE INCLUDED IN THE BID PRICES FOR BID ITEM NOS 2, 20 & 4

NEW STYLE
ST'D. MANHOLE FRAME & COVER
FOR VEHICULAR TRAFFIC

MARIN CONCRETE CO,
Dennis Marsh

STATE OF NEW YORK — DIVISION OF LICENSING SERVICES — LICENSED LAND SURVEYOR

August, 1976
AS BUILT
NUSSBAUMER & CLARKE, INC.
A CORPORATION AUTHORIZED TO PRACTICE ENGINEERING & LAND SURVEYING IN THE STATE OF NEW YORK
CERTIFICATE NO. 921
VICE PRESIDENT

BID SECTION "D"

REVISIONS			DESIGNED BY: J.T.	CHECKED BY: J.T.
NO.	BY	DATE	DRAWN BY:	CHECKED BY: R.U.M.
1	J.R.V.	9-15-78	DATE: MAY 1978	SCALE: AS NOTED
			JOB NO. 68-149	REPORT NO.
			DRAWING NO. C-6627-14	

NUSSBAUMER & CLARKE, INC.
CONSULTING ENGINEERS
BUFFALO, NEW YORK

CITY OF BUFFALO, NEW YORK
DEPARTMENT OF COMMUNITY DEVELOPMENT
WATERFRONT REDEVELOPMENT PROJECT NO. NYR-35

MANHOLE FRAME & COVER DETAILS

SHEET NO. 14 OF 16

S4376D

SULLIVAN-MCKEEGAN CO., INC. BUFFALO NO. 18 1108 400-8-71